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AMERICAN VETERINARY REVIEW

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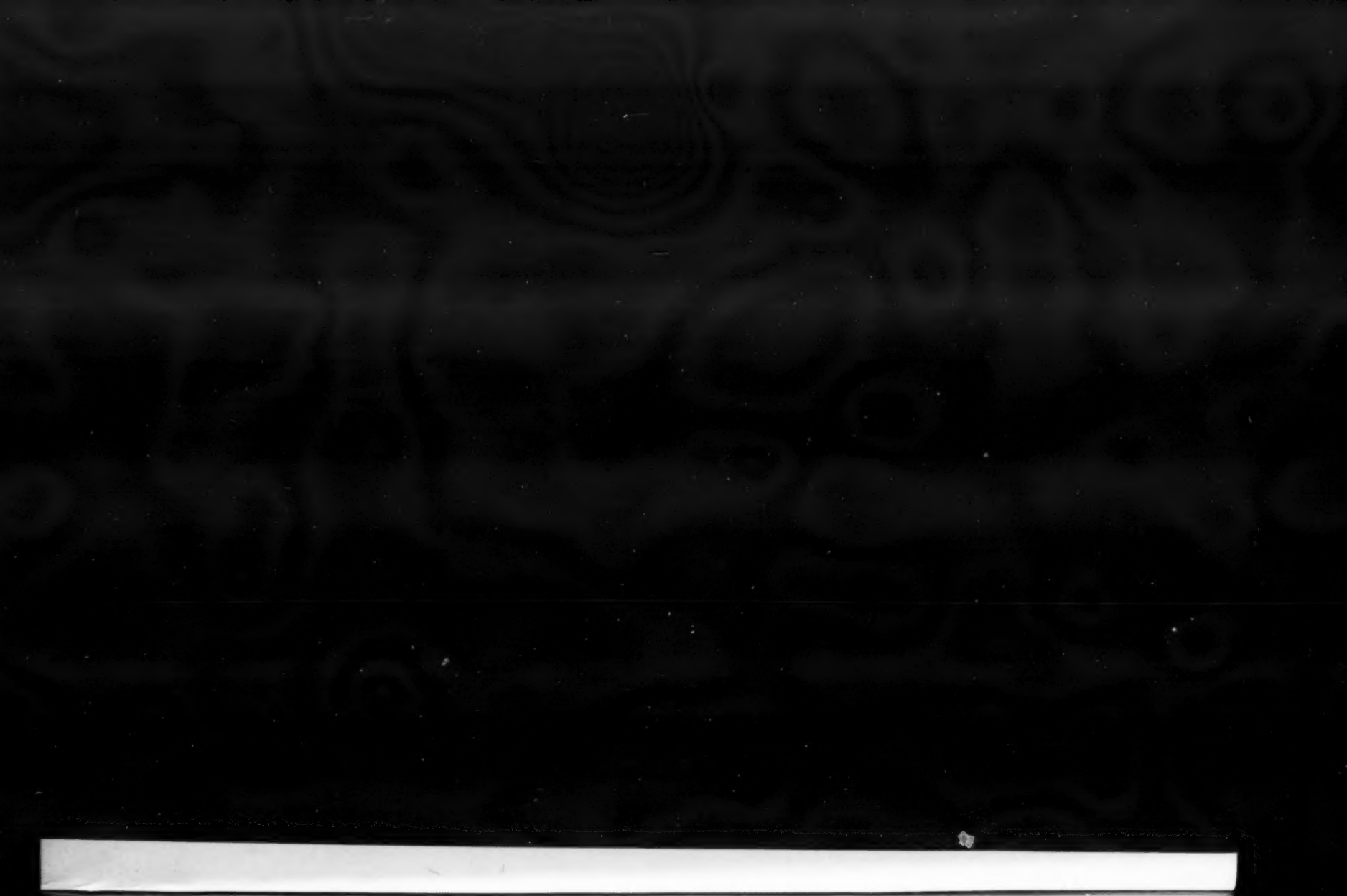

AMERICAN VETERINARY REVIEW.

DECEMBER, 1913.

EDITORIAL.

EUROPEAN CHRONICLES.

PARIS, OCTOBER 15, 1913.

EPIZOOTIC ABORTION IN BOVINES.—Amongst all the questions of important interest in veterinary medicine, *Epizootic Abortion* is one which has the right to claim a first place, interesting as it does, medicine and agriculture.

During a long time, epizootic abortion has been classified in the too long list of diseases, of which little or nothing was known. Perhaps information of some value was published relating to the mysteries that surrounded it; but it is Prof. Bang who has the honor of being the first to lead in the proper direction the study of abortion by experimental method.

Bang and Stribold discovered, in Denmark, a small bacillus which they considered as the agent of the disease. For a long time this discovery was the only one made. Only few experimentators confirmed it and yet the bacillus of Bang did not occupy the rank it should; so many other microbes being also claimed as being the agent of the disease by others. It is only in later days that the discovery of Bang was accepted. An English committee show that epizootic abortion was due to the bacillus of Bang, by a long series of valuable experiments, which were carried out and continued by those learned veterinarians, Sir John McFadyean and Sir Stockman. The discovery of Bang

was also confirmed by experiments and researches made in the United States, where the disease was prevailing more or less.

The fact then was no longer disputed that the bacillus of Bang is truly the cause of epizootic abortion in bovines, a specific disease, which must not be mistaken for other contagious abortions which are not due to the bacillus of Bang; such as contagious vaginitis which may be complicated with contagious abortion, and others which are not due to the specific bacillus of the epizootic abortion proper.

The discovery of the bacillus, the study of its characters, might be considered as facts of little importance if the researches started by Bang had not served and conducted to other observations.

To establish an efficacious system of prophylaxy, it was important to know exactly the ways of entrance of the infection. Sir John McFadyean has most completely solved the problem by experiments that show that infection can take place by the introduction of the virus through the mouth, the vagina or the sheath. Infection through this last entrance had not yet been realized and its demonstration is very interesting. Up to then, infection by bulls was considered as being only possible through the sheath, but the proof that it may as well take place through the mouth render the danger more evident and directly dangerous.

* * *

The retrospective diagnosis of abortion is easy. The fact itself, its contagiosity, its prodromes, the characters of the placenta, the bacteriological examination are, especially if associated together, sufficient to insure the diagnosis. But with these means, the disease may not be recognized except after it has manifested itself. They do not permit one to recognize the cows which are infected, those that will abort and that it would be important to isolate and separate from the healthy ones.

Sir John McFadyean and Sir Stockman were the first to demonstrate that the early diagnosis of the infection can be made by the exhibition of the specific properties of the serum. At

first they thought to use *Abortine,* a sterile extract of cultures of the bacilli of Bang, analogous to tuberculine. The results were not satisfactory.

The sero-diagnosis is better and can be made by agglutination or the method of the deviation of the complement. Both methods give satisfactory and precise answers. Agglutination however has a more simple technic. The method is specific, as all infected animals and those *only,* react. But all animals whose sero-diagnosis is positive may not necessarily abort; as abortion is only a symptom of the infection and this may exist and grant a certain immunity to the animal without abortion taking place. However, all the infected animals are dangerous; milch cows throw out bacilli in their milk and perhaps through other channels, all must be considered as dangerous.

Notwithstanding all that is known of the disease, its prophylaxy is not very advanced. All the sanitary measures find their immediate indications, isolation, disinfection, washing and disinfecting genital organs, etc. Chimiotherapy has given some good results, yet subcutaneous injections of phenol have failed. Vaccination has also been tried unsuccessfully.

Recently, Sir John McFadyean and Sir Stockman have tried the inoculations of living bacilli so as to confer immunity. The results obtained to this day are very encouraging and justify the hopes that at an early date *Epizootic Abortion* will be ranked among the scourges of animals that can be prevented.

* * *

Human and Veterinary Surgery.—In using this heading, in relation to the record of a case published by Prof. Coquot of Alfort, I merely desire to recall the fact that after all, whether in man or in animals, surgery is always the same in finding its applications, in cases of similar nature, requiring the same manipulations, asking the same conditions and in many instances ending in results of equal importance. In fact, veterinarians have often borrowed from human surgeons their modus operandi, and if they have not made as brilliant or numerous records, they

can nevertheless mention a number which call for special attention, as is the case suggesting this heading and has for title in the *Recueil* "COMPLETE EVERSION OF THE BLADDER, CYSTECTOMY, URTEROPESIA, RECOVERY." Evagination of the bladder, through the urethra and the ordinary meatus is a rare accident in mares, as although 53 cases are spoken of by Lanzilloti Buonsanti, only 3 well studied cases are spoken of in French periodicals.

The subject of this case was a mare, which had been delivered of a living colt, not without difficulty, as during the labor a perforation of the vagino-rectal wall and a complete evagination of the bladder had taken place through the violent efforts of the mother. Attempts had been made to reduce this, but without results, and the mare was sent to the learned professor, who had no difficulty in making a diagnosis with the characteristic condition of the animal and of the injured region.

Between both lips of the vulva and resting on the lower commissure there was a globular pisiform tumour as big as a child's head, and pedunculated. The appearance of the mucous membrane, the presence of the two little tubercules that represent the ureters, the urinary fluid that covers the parts and also now and then escapes by streams through the ureters, etc., everything confirms the diagnosis.

Although the reduction has already been tried several times during the three weeks that the mare is in that condition other attempts are made, using the greatest care to avoid the laceration of the organ, which is threatening by the condition of the bladder. All have failed, and a radical surgical interference is the last resource, which imposes itself, including cystectomy and ureteropesy; ablation of the prolapsed mass made as near as possible to the neck of the bladder after dissection of the ureters and then suture of those to the walls of the vagina.

* * *

The operation was made in four steps:

First.—DISSECTION OF THE URETERS.—This was made easier by the introduction in both canals of a rubber probe 3 millimeters

in diameter. The dissection was rendered quite delicate on account of an abundant hemorrhage. It extended on a length of about four centimeters.

Second.—SUTURE OF THE URETERS TO THE VAGINAL WALLS.—Made on the point of union of the vulva and vagina, with simple stitches, the suture of the ureters brought together the dissected part of the canals with the vaginal mucous membrane, incised with the bistouri.

Third.—APPLICATION OF AN ELASTIC LIGATURE.—This was placed one centimeter back of the points where the dissection of the ureters was stopped. To avoid the slipping of the ligature, a circular incision of the vesical mucous membrane had to be made. And so as to insure to the rubber cord a greater fixity, a stitch of silk was applied in front and back of it, through the middle of the pedunculum, formed by the protrusion of the evaginated organ.

Fourth.—ABLATION OF THE BLADDER.—This was cut away with a bistouri, 4 centimeters back of the elastic ligature.

The after care consisted in washing the vagina twice a day with physiological serum, followed by oxygenated water. Slight reaction took place on the third day with raising of the temperature and general dullness of the animal.

During the first 10 days micturition was irregular, taking place with great expulsive effort in variable quantity and every 15 minutes by drops or in small streams, soiling the inside of the thighs and hocks. But this condition gradually improved. The expulsion of the urine took place at various intervals, escaping at the lower commissure of the vulva, the animal stretching herself, about every fifteen or twenty minutes and throwing out about half a litre of urine at each time, that is, when a certain quantity of urine had collected in the floor of the vagina, which then filled the place of a temporary reservoir until a nervous reflex stimulated its contractions and gave rise to micturition.

This recovery, which required only one month to take place, shows that evagination of the bladder heretofore considered as a very serious, if not fatally ending, accident, can be the subject

of successful surgical interference, which will permit of saving an animal and allow him to render a certain amount of good work after a relatively short length of time.

Such cases are rare, it is admitted, but such favorable results as those obtained here deserve to be known.

* * *

RABIES IN SOLIPEDS.—The *Revue Generale* has published lately the records of two cases of *Rabies*, one in a horse, the other in a male donkey, which have given occasion for wise remarks from the authors. The symptoms of the disease, when it was developed, were in both subjects classical, but the fact of the rare occurrence of rabies in equines, the relatively slow process that one (the horse) presented and the difficult circumstances of the first examination which took place at night with light only, had not permitted a correct diagnosis at once. The horse being then treated for a simple case of pharyngitis, that his condition justified.

But when he began to show nervous manifestations besides refusing his food, breaking his halter rope, upsetting everything in his stable, staggering more or less in walking, and also pushing his head against the wall, the possibility that a nervous disease of some kind was developing was considered, and venesection recommended with ice to the head, and intestinal revulsion. As the animal was about being fixed for being bled, his physiognomy became haggard, his features contracted, he became snappish and rabies became evident, although no history of the horse having been bitten was obtained. It had taken some three or four days for rabies to become fully developed, and the groom was bitten, although he had been put on his guard.

The disease ran its course then normally. At one o'clock it was in its acme, the animal had spells of rage now and then, and at ten o'clock he was dead.

The diagnosis with the donkey was made readily. The disease with him occurred a few days after that of the horse, and ran its course in a few hours.

Careful inquiry made it suspicious that both animals had been bitten by the same mad dog. The period of supposed incubation was between 2 and 3 months, the inocculation having taken place at the point of the nose. Many mad dogs had been killed in the region where these two cases were observed, and the indications are that in such circumstances it is prudent to watch all animals liable to have been exposed and bitten, and in case of any presenting any abnormal manifestations in their health to bear in mind the possibility of hydrophobia.

* * *

BIBLIOGRAPHIC REVIEWS—STOMOXYS CALCITRANS.—Dr. M. Bruin Mitzmann, veterinary entomologist, and Dr. Archibald R. Ward, chief veterinarian, have favored me with Bulletin No. 24 of the Bureau of Agriculture of the Government of the Philippine Islands. *The Role of the Stomoxys Calcitrans in the transmission of Trypanosoma Evansi,* where after presenting the literature in reference to the subject, they consider the various methods they have resorted to in their experiments by the mechanical transmission. They then treated of the relations of the non-biting flies to stomoxys in contaminative infection, gave of the cylical development of trypanosoma evansi in stomoxys calcitrans, the question of hereditary transmission, the methods employed in feeding and keeping flies for laboratory purposes and those of applying flies to the host, and concluded their very interesting bulletin with the following general summary:

1. Only negative results were obtained in the attempts at direct mechanical transmission of surra with flies, which were induced to bite healthy animals at intervals ranging from five minutes to three days, after being permitted to complete the feeding upon infected animals. Thousands of stomoxys calcitrans were employed in 29 experiments, involving the use of 3 horses, 6 monkeys and 22 guinea pigs.

2. Twenty-seven experiments were performed in attempts to transmit Surra by the interrupted method of feeding. All attempts proved negative *where a single application of a varying*

number of flies was used, as many as 38 on a horse, and a maximum of 40 on a small guinea pig. The intervals between feeding on infected and healthy animals averaged 25 to 40 seconds in the two instances cited.

3. In three experiments, interrupted feeding was employed in successive applications. In attempting to determine the minimum number of bites necessary to infect an animal as high as 40 were followed by negative results. The only positive one obtained was produced from a succession of 206 interrupted bites in which the flies were transferred immediately from the infected to the clean animal. The flies were applied 32 hours during a period of six days.

4. The results of these experiments indicate that Trypanosoma Evansi does not develop in the body of Stomoxys Calcitrans. Ninety-four days was the longest period in which laboratory bred flies were tested for a cyclical development, and sixty-seven days the maximum for wild flies.

5. Organisms of Surra were not found in Stomoxys Calcitrans beyond 18 days after feeding on an infected animal, and the limit for infection by inoculation was ascertained in these experiments to be six hours.

6. Pathogenous trypanosomes were found in the proboscis of the fly thirty seconds after feeding on infected blood. Within one minute and thirty seconds the organisms were not present in the mouth parts in a form capable of infecting by inoculation into guinea pigs.

7. The wounds made by the labium of Stomoxis were not found to be a suitable channel for infection. Consequently it is not likely that Surra in domestic animals is produced through this avenue by external contamination; namely feces, mouth parts and pulvilli of infected flies.

8. The intimate relation in the feeding habits of *Stomoxys* and of house flies has been pointed out. Stomoxys has been demonstrated to provide through its bites the infection of *Musca Domestica* and other dung flies. These flies have been demonstarted to act as carriers, harboring the surra organisms for several hours.

9. No evidence was obtained to indicate that Typanosome Evansi is hereditary transmitted to the offspring of *S. Calcitrans.* The larvae of this fly fed on Surra blood does not continue to harbor the trypanosome and the fly is "clean" upon reaching maturity.

10. It is demonstrated that the individual glass-tube method is the most suitable for applying flies in feeding on experimental animals and for keeping flies for long periods under laboratory condition.

* * *

CANCER IN HORSES.—From the annual report of the Sanitary Veterinary Service of the City of Paris, by Mr. H. Martel, Chief, I find in the part concerning the section of *Hippophaic Abattoirs* some interesting statistics upon cancer amongst the horses which were killed in those abattoirs.

Cancer is very frequent in horses, and the statistical researches made in that direction, and which cover examinations of some 40,000 subjects, viz.: 20,000 mares, 16,200 geldings and 3,600 stallions, prove its frequency. The number of cases of cancer observed is 184, without counting those of melanotic sarcoma. Of those 184, 86 were in mares, 43 in geldings, and 55 in stallions.

In relation to the organs which were diseased, these 184 cases are represented by 62 of the kidneys, 50 of the testicles, 45 of the mammae, 9 of the intestines, 6 of the bladder, 2 of the ovary, 2 of the lungs, 1 of the uterus, 1 of the sheath, 1 of the jaw and five of origin not precisely established.

Most of those cases of cancer were observed in subjects advanced in years and above fifteen.

In classifying them according to the pigmentation of the teguments, 118 were found in animals of dark color (black, bays, or chestnut and its varieties), 66 were observed in clear color (white or grey).

In 21 cases pairs of organs were simultaneously affected. For instance, 6 cases were observed in mammae in the two glands,

10 in both testicles, 5 in kidneys. These last existed when the disease was generalized. In the others it was not.

In the cancers of the mammae, cancers were in form of tumours of different sizes in both glands and in each had developed at successive periods of times. In the cases of testicular cancer the development in each seemed to have taken place about the same time. In four cases, the cancer existed in the testicle in condition of abdominal ectopia.

Metastasis of generalization were observed in 66 cases, and in 42 of those involved glands, organs and serous membranes. In cases of testicular cancer generalization by general circulation was never observed.

In relation to melanotic sarcoma, Martel writes: It is extremely rare to find white or grey horses entirely free of melanotic tumours. These are localized preferably in the peri-rectal connective tissue, in the sub-scapular muscles, the parotid, the bones and the lymphatic glands, and are spread most often by the channel of the lymphatic vessels. When the generalization takes place through general circulation, the metastasis develops very rapidly and then mostly in the organs.

To serve to the history of cancer the above statistics are most valuable.

* * *

SUNDRY ACKNOWLEDGMENTS.—*The Philippines Agricultural Review.* The veterinary number of this periodical was received. Published as a monthly by the Bureau of Agriculture in English and Spanish, it indicates the importance that our profession has assumed in the Philippines. This number contains among its special articles, *The History of the College of Veterinary Science* at the University of the Philippines by Dr. D. B. Palmer, D.V.M., and Victor Buencamino, D.V.M., also *The Surra Conveying Fly of the Philippines* and some factors concerned in control measures by Dr. M. Bruin Mitzmain. Observations on *The Clinical Diagnosis of Glanders,* by Dr. C. H. Schultz *Kidney Worm Infestation of Swine,* by D. W. Hutchins

Boynton. The number is illustrated. In the editorial, the practice of veterinary art is alluded to by remarks that place it in the Islands amongst the few states, where such is protected and also those who are regularly graduated. It also tells that at the veterinary college, the requirements for graduation are attendance to lectures for five years, sessions of nine months.

" These are examples worth following."

First annual report of the Director of the Department of Public Health and Charities of the City of Lawrence, in Massachusetts.

Notes on *Complement Fixation* in Glanders by Langdon Frothingam, M.D.V., and Stephen O'Coole, D.V.M.

Chicago veterinary college *Bulletin* and Announcement for 1913.

A. L.

WHAT ARE WE GOING TO DO IN THE UNITED STATES SENATE?

Actions speak louder than words. Faith without works, is dead.

The army veterinary service bill having already been introduced into Congress on May 1st as H. R. 4541, what is to be our plan of action in order to move the bill forward?

In the present month, December, the 63d Congress, under constitutional provision, assembles in its first regular session. The time has arrived when our bill must be made to start on its legislative path. There are four steps to be taken: First, it must be read and passed by the Committee on Military Affairs of the House; second, it must be read and passed by the House as a whole; third, it must be read, and, in either approved or disapproved form, be passed upon by the Senate Military Committee; fourth, it must be approved by the Senate as a whole. Our plan is to begin the movement of the bill with the reading of the House Committee on Military Affairs, where it now is resting in

readiness for the December assembling of Congress. Why? The House has approximately four times as many members as the Senate (395 to 98). The House, therefore, by dint of numbers and direct selection by the people, has always more clearly voiced the thought of the people in its legislation. What passes the House is apt to pass the Senate, if the majority in both are in political agreement as at present. And if the bill passes by a comfortable vote in the House, the chances in the Senate are proportionally better. Many people make the mistake of thinking that there is a great gulf fixed between the Senate and the House and that there is no intercourse between the membership of each body. As a matter of fact, the members of both houses mingle freely in Washington, and there is frequent conference and collusion of members of both houses from regions of the country interested in definite kinds of legislation, or there is agreement and combination of the members of the delegation to Congress of any one State or group of States for furthering particular pieces of legislation. The voice of the House, therefore, most assuredly has effect in the legislation in the Senate by the in season and out of season agreements and understandings. The members of any State delegation sent to Congress soon get to know each other well, and the opinions of the Representatives to Congress from any State impress the minds of the Senators from the same State. Indeed, there can be no mistake in saying that the mind of a Senator from any State is apt to be set or altered by the thought of the majority of the Representatives to Congress from the same State, or by the decisions on pending legislation arrived at by influential Representatives in the State delegation to Congress. Representatives have a strong hold on the minds of the Senators from their regions. This constitutes another important reason, therefore, why we are going to start our bill on its way in the House.

What leverage on the Senate can be had by seeking close acquaintance with Representatives to Congress?

The secret of success in inducing Representatives to Congress to favor and work for the army veterinary service bill consists in seeking close acquaintance with them and showing them

why they must have a personal and vital interest in it. What is good for them and their constituents ought to pass. But when an attempt is to be made to get legislation of this sort the profession becomes divided into two groups, one large and potent; the other small but indifferent. I refer to the *workers* who constitute the first group, and to *the well-meaning but half-hearted sympathizers* who belong in the second group. The workers, a magnificent body of loyal men, constituting the bulk of the profession in America, are ever ready to put their hearts and minds into this reform. The well-meaning but half-hearted sympathizers are those who say, " This is a good thing, I hope the bill will pass and that the boys will get what they want "—and they let the matter go at that. There would be no veterinary reform until the end of the world if such men were in the majority. They are not. The gospel of work is being preached by veterinary reformers, and it is vitalizing all hearts to seek success for this bill. " Faith, without works is dead." Any man who claims he pins his faith to this reform and does not work for it has a fibreless, unreal faith. But the immediate appeals of the workers are converting such men from the error of their ways, and it is high time that this should be so. Because the services of every American veterinarian are in demand to acquaint their Representatives to Congress with the need for this reform. Leverage on the Senate may be had by our educating first of all our Representatives on its needfulness. The size of the vote in favor of the bill in the House will affect the Senate. Our success in educating the members of the House will ease our path in the Senate.

How are we to put the army veterinary service bill through the United States Senate?

1. All chosen immediately by the 90,000,000 of our people and the 5,000,000 in our dependencies, the Representatives to Congress voice the thought of the people directly. The thousands of veterinarians in each State and Territory should seek a close acquaintance with these, the people's representatives, and appeal to them in favor of the bill. Its passage by a handsome majority in the House would ease its course in the Senate.

2. In each State delegation to Congress the influence especially of leading Representatives is to be sought for our measure and for their power to persuade their Senators to aid it. Men are gregarious—they are disposed to go in flocks as leaders point the way.

3. There are Senators who can be won without this plan by veterinarians or their friends who have access to them. Opportunity should not be lost to strengthen the interest of those favorably disposed, or to swing the wavering to the side of the bill.

Winning in the Senate is a matter of thorough campaigning. As the country speaks, the Senate will act. The country speaks as the House of Representatives votes.

G. S.

VETERINARIANS AND THE ALLIED HORSE INTERESTS.

The above caption surmounts a correspondence, published on page 386 of this issue, from Mr. T. Butterworth, editor of *The Live Stock Journal*, Chicago; a paper that has faithfully championed the interests of the horse industry of America under all conditions for the past quarter century; especially the draft horse, the more extensive breeding of which, Mr. Butterworth has unceasingly urged; his keen foresight having foretold a constantly increasing demand despite the advent of the motor truck. In his letter of transmittal, Mr. Butterworth says:

"I enclose you a brief item, of importance to veterinarians, who should take the lead in promoting horsebreeding. Improvement that will in the same proportion advance the veterinary interests and prosperity. The eager market demand at the high price must be met, or the work must be done with the auto-trucks that help the horses but little—the few thousand against our twenty-five millions of horses and mules. Your great paper can do no greater work for the veterinary profession than to rally to the help of

the farmers in this crisis. I started to write the item for my own paper, but it seemed more important for yours, so loyal to the veterinary interests. I am glad to have your co-operation in this good work."

Here is a direct call from the stock-breeding interests to the veterinary profession; let it not go unheeded. There are hundreds, many hundreds, of men in our ranks who can give material help to the horse-breeding interests of America, if they would but disseminate their knowledge through their pens. And the best means of dissemination is through the profession itself. Contribute your knowledge to your brothers in the profession through these pages, and let them in turn disseminate it to their clientele, and it becomes world-wide. Let some Brother write on draft horse breeding, the breeds best adapted for improving our native stock for heavy draft work, and those best adapted to the production of farm horses. Let some other Brother take up the solution of the production of horses for our army service, which has been much discussed out of the profession and is still far from solved. Our markets are only half supplied with business horses for general delivery of household goods, a branch of horse services that mechanical appliances have left untouched except for a few large dry goods houses in the large cities; and a reaction is taking place in some of these, and in other industries that had received the impression that they had to have automobiles to keep abreast of the times, but have since found it to their advantage to return to the horse.

The horse industry of America has nearly a billion dollars' greater valuation than all the cattle, sheep and hogs, or all the grain crops of corn, wheat, oats, barley and rye; a total of thirty million head on the farms and in the cities; the greatest of any nation. But we have not enough for the demands; the horse industry needs encouragement, it needs advice as to its direction and the economical management of breeding problems; and a direct call has come to our profession for such direction and advice, which is a recognition of our ability to aid—nay, direct—the greatest agricultural industry of our country. Let us report for duty without delay.

THE COCAINE LAW AND VETERINARIANS.

On page 410 of this issue we have published a ruling by Attorney General Carmody of the State of New York as to cocaine prescriptions by veterinarians. This ruling makes it clear that druggists may not fill prescriptions calling for cocaine signed by either veterinarians or dentists, and that to members of either of those professions the use of the drug in question is limited to its purchase in original packages and its direct administration to the patient. This law has caused some dissatisfaction on the part of members of the veterinary profession, and some chafing at the collar, not so much on account of the inconvenience that it may have caused them, as that they feel as though they are being discriminated against. They feel that as graduates in medicine (even though it is a special branch) their signature should carry just as much weight on a prescription calling for a dangerous drug as that of their brothers in medicine. And really it does seem as though the law to be consistent should be reversed. The veterinarian's patients cannot become addicted to the cocaine habit, while the physician's patients can, and do. Well, then, would it not seem that if any one class of practitioner should be restricted to its use by direct administration to his patient, that particular class should be the physician, so that there would be no possibility of prescriptions being refilled. The cocaine law may be right in so far as its restriction of the purchase of cocaine to that of obtaining it in its original package and not allowing it to be part of a prescription, if its application was a general one, but its application to veterinarians and dentists only, more particularly the former, we feel is wrong. We should like a free expression of opinion on it from REVIEW readers.

HISTORICAL COMMITTEE, A. V. M. A.

D. Arthur Hughes, Chairman

H. S. Dumphy Tait Butler

The above is an additional committee received from Secretary Mayo, and not included in the list sent to the REVIEW for publication last month and which appeared on pages 274 and 275.

ORIGINAL ARTICLES.

THE PERSISTENCE OF THE BACILLUS OF INFECTIOUS ABORTION IN THE TISSUES OF ANIMALS.*

By W. E. Cotton, D.V.M., Bureau of Animal Industry Experiment Station, Bethesda, Md.

It is the purpose of this paper to show that infectious abortion of cattle is one of those diseases in which a very large proportion of the cows, at least those infected with the strains of the disease with which we have worked, harbor the abortion bacillus for a very long time and eliminate it, more or less continuously with their milk, without showing visible lesions in the udder, for months and years after the active manifestations of the disease have subsided. In some instances the bacillus of abortion is eliminated by animals in which active disease has not asserted itself at all. Something will also be said as to the length of time the organism remains in the uterus after abortion, and also as to its persistence in the tissues of small experiment animals.

The work from which the data was obtained was done at the Experiment Station of the Federal Bureau of Animal Industry, at Bethesda, Md., under the direction of Dr. E. C. Schroeder, Superintendent, to whose guidance and help I am greatly indebted both in making the observations and in preparing the data presented.

At the forty-eighth annual meeting of this Association, Dr. Schroeder and I presented a paper (1) in which we described an organism that we had found to be eliminated with the milk of a considerable number of apparently healthy cows; that it was of common occurrence in market milk; and that it produced lesions in guinea pigs which somewhat resembled those produced by the

* Presented to the fiftieth annual meeting of the American Veterinary Medical Association in New York, September, 1913.

tubercle bacillus. At that time we had failed to identify the organism, which we now know to be that of infectious abortion.

To gain some information as to the constancy with which aborting cows eliminate this organism with their milk, and the length of time they persist in doing so, as well as that during which the genital tract remains infected after an abortion, careful watch was kept over all the cows at the Experiment Station; infectious abortion being present among them and slowly infecting the entire herd.

The presence of the abortion bacillus in milk, as well as in other materials, was determined by the inoculation of guinea pigs, in which, as we have pointed out, it produces characteristic lesions. We have also made cultures from many of the guinea pigs showing these lesions, and recovered the bacillus from them. In making tests with guinea pigs, two were inoculated in each instance. In making the milk tests, each guinea pig received from 4 to 6 cubic centimeters of whole milk intra-abdominally; in tests of other material the inoculations were usually made subcutaneously. It should be said of the guinea pigs used in making these tests, as well for all those used for any purpose at the Experiment Station, that of the several thousand that we have autopsied since this investigation has been in progress, we have yet to find lesions of abortion disease in a single guinea pig in which we had not a right to expect to find it. The work is thoroughly checked up by very many tests of milk and other materials, in which guinea pigs were used, both in this and in other investigations.

The reproductive organs of a bull that had been used to serve some of the aborting cows, and the testicles of two bull calves, one of which had been fed and the other injected with cultures of the abortion bacillus, were tested for the presence of this bacillus, but it was not found to be present in any of them, though portions of practically all of the reproductive organs of the adult bull were used in making the tests. We were led to make the above tests because a large proportion of male guinea pigs which are infected with abortion bacilli, develop grave lesions of the testicles and epididymides; and we have found that these males infect females with which they copulate. We also found the lesions to be present

in the epididymis of a rabbit that had received an intro-venous injection of the abortion bacillus a number of weeks previously. We thought it possible that the organism might remain in the testicles and epididymides of the male bovine animals without producing visible lesions, as it does in the udder of the female. So far as our investigations have gone, it seems that the bull does not harbor the bacillus in this manner, but they have not yet progressed far enough to be conclusive.

In our milk tests, we found that of the cows at the Experiment Station nineteen have records of having aborted, of having eliminated the bacillus with their milk, or both. It will be necessary to give the records of a few of these in detail, because of some peculiar conditions in each, and in order to show the regularity with which the organism is eliminated from some animals.

Cow 637 is perhaps of the greatest interest, since it was she in which we first demonstrated that the bacillus was eliminated from the udder, and hence, we have a longer record of her than of the other animals. She was purchased from the Maryland State Experiment Station, and according to its records aborted on September 21, 1907, in the seventh month of pregnancy. She has aborted once since she has been at Bethesda, on July 25, 1911, in the fifth month of pregnancy, the abortion bacillus being found in the fetus.

The first test of her milk, made on February 20, 1909, was positive. Later tests were made as follows: Nine in 1909, four in 1910, fourteen in 1911, thirteen in 1912, and three in 1913; 44 including the first. With the exception of two, made two and three months after abortion, all were positive. She has thus eliminated the abortion bacillus almost continuously for at least 4¼ years; and if counted from the time she is reported by the Maryland State Experiment Station to have aborted, which, judging by our experience with other cows, is the probable time at which the milk became infected, would make five years and eight months as the probable time that the organism has persisted in her udder. Her milk when last tested was just as virulent for guinea pigs as it ever was, and we have no reason to believe but that the bacillus will persist in her udder permanently.

She produced a calf fifteen months after the last abortion occurred; tests made of the placenta showed that the bacillus was absent.

A remarkable fact in connection with this cow, as well as with all cows that carry the abortion bacillus in their udders and yet abort a second time, is that the bacillus in the udder did not induce the production of sufficient anti-bodies to prevent the invasion of the uterus and consequent abortion. It is possible that abortion may have been caused by infection with another strain more virulent than the one in her udder, but this idea does not seem to be in harmony with the laws of immunity. An attenuated strain of an organism ought to induce some immunity against a more virulent one and besides in this instance, as nearly as we could determine by cultural methods and guinea pig tests, the organism from the udder and that from the fetus were identical.

Cow 479 is also of interest in this connection, since she has aborted twice, and because of the appearance of the abortion bacillus in the placenta discharged at a normal parturition, the third such since the last abortion, four years and five months after the abortion occurred. This seems to indicate that abortion bacilli sometimes appear in the uterus years after an abortion, but either because of the lateness of their appearance, or the high resistence of the organ, are prevented from damaging the placenta to such a degree as to cause abortion.

We have tested the placentae of two other cows, each passed at the termination of the normal pregnancy following an abortion, and that from a normal birth in a cow that never aborted, but which harbored the abortion bacillus in her udder, all with negative results. Just how frequently the condition observed in cow 479 occurs, I am unable to say, but from the fact that one such case was found out of four animals tested, would indicate that it is not uncommon, and hence it follows, that if aborting cows are permitted to enter healthy herds, that the discharges from the uterus following a subsequent normal parturition must be regarded with suspicion.

While the condition found in this cow may be attributed to a new infection, it seems much more probable that it was due to

the migration of the bacillus from the udder to the active uterus. We have found the supra-mammary glands of cows to be infected, showing that the bacilli were travelling towards the blood stream, and once in that it, is not difficult to conceive of them reaching the pregnant uterus, where, finding a favorable soil in the embryonic tissue which it contains, multiply and set up disease. In some respects the abortion bacillus behaves much like the tubercle bacillus, which may remain latent at some point in the body, till conditions arise that make it possible for it to migrate from the original focus to some organ, the resistence of which is below normal, and set up disease. The abortion bacillus, so far as we know, is able to develop only in the pregnant uterus and the udder; the former being the seat of its greater activity, comparable to the weakened organ in tuberculosis, and the udder the seat of the latent focus from which it is infected.

Tests of this cow's milk showed it to be infected when first tested, November 21, 1910, and that it was still infected, May 5, 1913, twenty-nine months later. Sixteen tests made in 1912, and three in 1913, showed the bacillus to be present in all but two. She has, therefore, eliminated the abortion bacillus from her udder, to our knowledge, for twenty-nine months, and for the last sixteen months, at least, almost continuously. As her second abortion occurred four years and seven mouths previous to the last milk test, the organism must certainly have persisted since that time, and in all probability since the time of her first abortion, or for a period of five years and seven months. Separate tests made of milk from each quarter of her udder on May 5, 1913, showed that all quarters of this organ were infected.

Cow 751 has aborted twice, in her second and third pregnancies, on December 19, 1911, and on February 11, 1913. Abortion bacilli were found in placenta at first abortion, but not in fetus, and in both placenta and fetus at the last one. Repeated tests of vaginal scrapings proved that the bacillus was eliminated through this channel up to and including the thirteenth day following abortion. Several subsequent tests were negative. In one other animal, the vaginal scrapings were found to be infect-

ious forty-six days after abortion. McFadyean and Stockman (2) found that the bacillus had disappeared from the uterus of a cow killed one month after aborting.

One observation made in connection with this cow proved that uterine discharges containing abortion bacilli can be exposed to the weather for a considerable time and the bacilli remain alive. A large quantity, perhaps 250 c.c., of clear mucous containing islands of chocolate colored flocculent material was passed from her uterus on the eighth day after abortion. It was allowed to remain on the ground, exposed to the sun for ten days, the weather remaining clear for the most part and warm for the season of the year (February), by which time it had dried into a tough leathery-like mass, which on being tested by guinea pig inoculations, was found to contain living abortion bacilli. Unfortunately the material left after the tenth day of exposure was accidentally destroyed, so that we were not able to determine the maximum length of time that the bacillus will remain alive under these conditions.

This cow's milk was found to be infected at the first test made, nine days after her first abortion, and was still found to be infected when last tested, February 15, 1913, thirteen and one-half months later. Twenty-nine tests were made in 1912, and four, in addition to the last one, in 1913. Of all tests made, thirty-one were positive and four negative. She has therefore already eliminated the abortion bacillus almost continuously with her milk for thirteen and one-half months.

We have found the abortion bacillus to make its appearance in the milk of three cows before abortion occurred, and in one of these even before the beginning of the pregnancy which was terminated by an abortion. The one in which this occurred, No. 621, gave birth to a calf at term, on December 20, 1911, tests of milk made eight, thirteen, sixteen and twenty days after, were all negative. The next one, however, made sixty-five days after the birth of the calf, was positive, as were also two others, made six and fifteen days after this. She was served fifty-two days after the bacillus was first found in her milk, and aborted on

November 4, 1912, two hundred and fifty-five days after it was found. Tests of her milk made in the third, fourth, fifth and sixth months of her pregnancy were all positive, as were also daily tests made the first week after abortion, and six others made at irregular intervals, the last of which was made on May 26, 1913. She has then continuously eliminated the bacillus with her milk beginning nearly two months before the beginning of a pregnancy which was terminated by an abortion, and has continued to do so with great regularity up to the last time her milk was tested, a period of fifteen months.

The record of this animal shows that a cow's milk may become infected before conception, and seems to indicate that instead of the presence of the bacillus inducing immunity when introduced at this time, as has been supposed, it is stored in the udder till the uterus by becoming active furnishes a soil for its rapid multiplication. It seems therefore that any system of immunization that depends on the subcutaneous or intravenous injections of living cultures of this organism before conception is unsafe; for it would not only probably make most of the animals so treated carriers, and contaminate their milk, but would, at least occasionally, set up active disease. I do not want to be understood as opposed to efforts to evolve methods for immunization, and I hope that something can be done in this direction, but immunity in this disease seems to be such an uncertain quantity, and the possibilities for evil in this organism, not only for animals but for man as well, so great that we had better go slowly.

The two other cows in which the bacillus appeared in the milk before abortion are Nos. 616 and 760. In the first of these, the abortion bacillus was found in the milk 32 days before abortion occurred; the next preceding test was made nearly a year before and was negative, had tests been made between these it is possible that we would have found the bacillus present at a much earlier date. Thirty-five tests of her milk have been made subsequent to the first positive one, of which thirteen were positive and twenty-two negative, the last one giving positive results being made eleven months after her milk was first found to be

infected; four succeeding tests were negative. She therefore began to eliminate the abortion bacillus with her milk at least a month before abortion, and continued to do so intermittently for eleven months, after which it seemed to disappear, though owing to the intermittent character of its elimination, we can not be sure of this till other tests are made.

The abortion bacillus was found in the milk of cow 760 sixty-three days before her first abortion, which occurred in the sixth month of her second pregnancy; but four tests made about four months before abortion were negative. She aborted a second time in the 8th month of her next pregnancy, abortion bacilli being recovered from placentae and fetal organs of both pregnancies. Sixteen tests of her milk have been made at intervals of from one day to two and one-half months, the last being made eleven months after the first positive one. Thirteen of these, of which the last was one, gave positive results.

Three cows, Nos. 171, 503 and 638, have never aborted, yet have continued to harbor the abortion bacillus in their udders. They are somewhat like those cases in man which continue to harbor the typhoid bacillus though they have never manifested symptoms of the disease. For some reason, the uteri of these cows seem to have either inherited or acquired sufficient resistence to prevent the organism from developing there, at least to such an extent as to produce abortion, though it continues to persist and to multiply in their udders; sufficient general immunity not being produced to drive it from this stronghold. Has the abortion bacillus, present in the udders of these cows, induced immunity in their uteri which it failed to do in cows 637 and 621, or must we regard these organs as naturally immune in these cows, or is there some other reason?

Mohler and Traum (3), Larson (4) and others have shown that some cows react to the complement fixation test but do not abort. No doubt many such are of the kind just described, and that the reaction depends on the actual presence of the abortion bacillus. In other words, a cow reacting to this test probably has the organism either in her udder or uterus.

This type of carrier is a dangerous one, because unsuspected, and can only be found by making milk tests, or one of the serologic tests. Some simple reliable test is urgently needed, and it is to be hoped that such a one will be perfected in the near future.

The records of these cows are as follows:

Cow 171 was born at the Experiment Station, has produced eight normal calves and has never aborted. Abortion bacilli were found in her milk the first time it was tested, April 24, 1911, about three months after the birth of her last calf. Thirty-six tests were made in 1911, in April, May, June, August and November, all of which proved to be positive. She was served six times, beginning about a year after the birth of her last calf, but did not become pregnant and was killed, March 21, 1913, when abortion bacilli were still found in her udder, over twenty-two and one-half months after they were first found. The strain of bacillus eliminated by her was particularly virulent for guinea pigs.

Cow 503 came to the Station when eighteen months old and is known to us to have never aborted. She has produced five calves and is again due to calve in October. Tests were made of placenta of last pregnancy, but no abortion bacilli were found. The first test of her milk, made in November 1910, showed the abortion bacillus to be present, and it was still present in December, 1912, over two years later. Twenty-eight tests made in 1910, 1912 and 1913, showed the bacillus to be present in seventeen and absent in eleven.

Cow 638 has not aborted since she came to the Bureau Experiment Station. She was purchased from the Maryland State Experiment Station five years ago, and according to the records of that institution had not aborted up to the time we received her. She has produced five calves since then. The abortion bacillus was found in her milk the first time it was tested, January 24, 191, and also at the last test, June 6, 1913, or over three years and four months later. Fifty-seven milk tests were made as follows: Twenty-three in 1910, eighteen in 1911, six in 1912, and ten in 1913. Forty-nine of these were positive and eight nega-

tive; all those made this year being positive. Separate tests of milk from each quarter of udder, made on February 2, 1911, showed all quarters to be infected. Similar tests made on May 6, and on June 6, 1913, showed three-quarters to be.

Nine other cows which have aborted in from the fifth to the eighth month of their pregnancies, have already been eliminating the abortion bacillus, some continuously, some intermittently, for periods varying from two and one-half to twenty-nine months, and if kept under observation longer, I have no doubt will continue to do so for months and years to come, for in none of them is there evidence of the infection dying out.

One cow, No. 758, that aborted a fetus in which the abortion bacillus was demonstrated, has given negative results to all milk tests thus far made. She is certainly the exception that proves the rule. Her abortion occurred in the seventh month of her second pregnancy. It is possible that even in this cow more frequent tests would have revealed the bacillus in her milk, for we have one other cow the milk of which shows infection only at long intervals.

Summary.

Of the nineteen cows under discussion, eighteen have eliminated the abortion bacillus with their milk, sixteen are known to have aborted, three have not aborted but eliminated the bacillus with their milk, and one aborted but we were unable to find that her milk was infected though abortion bacilli were found in the fetus.

One cow is known to have been eliminating the bacillus with her milk practically continuously for four years and three months. One almost continuously for two years and five months and the organism must have persisted in her body for at least four years and seven months; one almost continuously for thirteen and one-half months; one continuously for fifteen months; one intermittently for eleven months; one almost continuously for eleven months; one continuously for six and one-half months, then she became dry and the bacillus was still present in her udder tissue

thirteen and one-half months later; one intermittently for over two years; one almost continuously for over three years and four months, and nine continuously or intermittently for from two and one-half to twenty-nine months.

Since different strains of this organism seem to possess widely different cultural characteristics as well as degrees of virulence, it is possible that animals infected with other strains than those with which we have worked may give different results. Fabyan (5), however, found out of a herd of twelve cows two which eliminated the organism in their milk. One of these had aborted a week before in the eighth month of pregnancy and the other gave birth to a normal calf eleven months before. Another cow aborting at the third month was negative. These results are confirmatory of our observations.

Persistence in Small Experiment Animals.

Just a word as to the persistence of the organism in the tissues of guinea pigs, rabbits and mice. We have recovered the bacillus from the spleens of guinea pigs showing lesions, seventy-one and seventy-seven weeks after infection. Tests made of five other guinea pigs which had been injected with the abortion bacillus twenty-one to twenty-seven months previously, and which showed only very slight lesions on autopsy, were negative.

The apparently normal spleen and liver of a rabbit, which had received three intra-venous injections of abortion bacilli, were found to contain the organism one hundred thirty-one days, or nearly nineteen weeks after the last injection was made. The organism was found to be present in the spleens of three white mice, in which it produced lesions one hundred three days, or nearly fifteen weeks after inoculation.

Fabyan (6) reports finding the organism to be present for sixty-seven weeks in guinea pigs, ten weeks in the spleen of a rabbit, and for considerable periods in the tissues of monkeys, rats, mice and pigeons after injections with abortion bacilli; though with the exception of the guinea pigs and mice without producing lesions.

CONCLUSIONS.

1. The bacillus of infectious abortion, or at least the strains with which the Experiment Station has worked, may, and in most cases does, persist in the udders of cows that have aborted for years and possibly for the balance of their lives; and during this time is eliminated more or less continuously with their milk.

2. It may make its appearance in the milk months before abortion occurs, even before a conception that is terminated by an abortion.

3. It may be eliminated for years from the udders of cows that never aborted.

4. It may persist in the genital tract for as much as forty-six days after an abortion; and the bacilli contained in uterine discharges may resist the action of sun and weather for at least ten days.

5. It may appear in the placenta of a normal pregnancy subsequent to an abortion.

6. It may persist in the spleens of inoculated guinea pigs in which there are lesions for seventy-seven weeks, and in the spleens of inoculated rabbits for nineteen weeks, without producing lesions.

It is to be hoped that we will soon know more about this strange organism. Its variable character and the seeming existence of many strains, no doubt, are responsible for much of the confusion in the past, and the fact that it seems to prefer primitive embryonic tissue as a soil, suggests that it may be an organism not yet fully adapted to differentiated tissue, and ready, by a process of mutation, to assume additional pathogenic significance in several species of animals. In other words it may be the possible parent germ of some future pathological factor.

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4. Larson, W. P., Journal of Infectious Diseases, March, 1912, p. 184.
5. Fabyan, Marshall, Journal of Medical Research, May, 1913, p. 88.
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THE TISSUE MEDIUM.

By John A. McLaughlin, D.V.S., New York, N. Y.

A tissue medium is essential to the organism. It is only by such a medium the tissues can exist, and on the existence of the tissues depends the existence of the organism. To study this medium and the phenomena attending its production, is the object of this paper.

Digestion—Digestion is the preparation food undergoes in the alimentary canal, to the end of producing the tissue medium. Food exists in the outside world, and consists of organic and inorganic matter. Not all organic, or all inorganic matter, is fit for food; some are without nutritive value, some are incapable of digestion, some are injurious, some fatally so. I mention this because I wish to lay stress on the fact that the animal organism is possessed of a wonderful power in its choice of food, and without such a wonderful power being inherent in it, animal life, at least large animal life, would long ago have ceased to exist.

Tissues constitute the material of which the animal organism is composed. Tissues themselves are composed of cells, plus cell products. The tissues are so arranged as to form systems, apparatuses and organs, each playing its individual part, but all playing towards the same ultimate end, to the production of the tissue medium. The life of the tissues depends on powers peculiar to themselves, but to exert their powers they must be supplied with an appropriate medium. Each cell of a tissue is a living unit. Quoting from Chauveau: "The cell is pre-eminently the anatomical element. The cell lives like an entire organism: it feeds, grows, multiplies, absorbs, secretes, moves, etc. It behaves like a complete animal, though it be a microscopical one." The organism supplies this medium.

Digestion is the first process toward producing this medium. The process in its entirety is composed of a number of lesser processes, the first of which begins with the selection of, and the introduction of food into the mouth, the last with the production of *chyme.*

To produce chyme, the food must undergo three special processes: *first,* that which takes place in the mouth; *second,* that which takes place in the stomach; *third,* that which takes place in the intestine. Resulting from these processes is the chyme, also a large residue, which is eliminated by the inferior part of the alimentary canal.

A study of the alimentary canal shows a beautiful arrangement of its several parts, with one exception—the arrangement of the liver and pancreas. To this exception I will refer later. A study of the mouth describes a cavity (buccal cavity) in which the various parts are put together in such a manner that it is impossible to misinterpret the oneness of their function. Teeth masticate, the lower jaw is movable, the tongue rolls the morsel of food, other muscles assisting, whilst the salivary glands are so arranged as to permit of no doubt of their function as accessory organs, and no possible error as to the function of the saliva. The buccal cavity is certainly beautifully arranged to perform the first process in digestion, for it is constructed with every regard for mechanical laws, especially that law regarding economy of space.

The stomach is also built in the same beautiful manner, and with the same regard for mechanical principles, and if possible, with an even greater regard for that particular principle, economy of space. The muscles which triturate the food practically constitute its walls, and within the inner lining of these walls are the gastric cells, whilst its inlet and outlet are so constructed as to permit the easy entrance of food, whilst it prevents its egress until acted on by the gastric juice.

In the small intestines we find the same plan of structure, the same regard for mechanical principles, the same emphasis on the conservation of space, except, as I have stated, where the liver

and pancreas are concerned. Here mechanical principles, if not cast aside entirely, are not treated with due attention, especially as regards conservation of space, for these organs, instead of being in close touch with the intestines as are the salivary glands with the buccal cavity, and the gastric cells with the stomach, are situated in the abdominal cavity. I have dwelt much on this lack of harmony in mechanical principles, for I intend advancing a theory that is in accord with them.

The production of chyme, then, is the result of three processes. When we analyze these three processes further, we find that in the mouth there is but one secretion, in the stomach but one, but in the small intestines three. Why three in the small intestine? Why this difference, not only in the structural arrangement of its various parts, but in the number of its secretions? As far as I can discover, physiology gives no satisfactory answer. As yet we are not a unit on the functions of the bile and pancreatic fluid.

In the production of chyme, however, the alimentary canal has performed its mission. With the disappearance of this chyme, the sensation of hunger makes its appearance. I mention this to draw attention to a deduction that as ***hunger*** is peculiar to the alimentary canal, so ***thirst is peculiar*** to the great Lymphatic System, as *oxygen* is peculiar to the circulatory apparatus.

The Alimentary Lymphatics—After the alimentary canal has completed its part in the production of the tissue medium, it is still an imperfect medium. No one argues for a moment that the tissues could exist in a medium of chyme. As a matter of fact chyme is toxic to the tissues. It remains, therefore, for some other apparatus or apparatuses to continue and eventually complete this task. As the chyme immediately passes into the alimentary lymphatic vessels, I interpret the work of this part of the lymphatic system as continuing the work begun in the alimentary apparatus. In fact I interpret the function of the *Great Lymphatic System,* as continuing and eventually completing the production of the tissue medium.

As we continue our investigation we find that the alimentary lymphatics change chyme to chyle, and empty this chyle into the circulatory apparatus. This chyle means everything that passes from the alimentary canal into these lymphatic vessels, and these vessels transport every particle of it to the veins. A great many changes occur in the composition of the chyle from the time it enters these vessels until it leaves them, but the change is *en masse,* so to speak; I can only compare it to the ripening of fruit. Chyme is toxic but chyle is not, at least not when it passes into the veins. I do not mean to infer that chyle, even when it constitutes the blood, is absolutely harmless, or indeed not very harmful; quite the contrary; but its toxic properties are so modified that they may be eliminated from the system before their toxic effects are apparent.

I wish to call attention to one faculty all parts of the *Great Lymphatic System* possesses in common: They take into their interior and with the same avidity, injurious as well as beneficial substances; it is immaterial what gets into the system, whether it is good, bad or indifferent, the lymphatics carry it to the veins; they have no selective power of their own.

It will be noticed that I have ignored the theory of *absorption.* The omission is intentional. My belief is that absorption performs no special function in the organism, much less such an important one as changing chyme to chyle. Absorption, while a function of dead tissue, is antagonized by living tissue. In rejecting the theory of absorption, I am not entirely alone. Hofmeister has "identified himself with the theory that the absorption of peptone is not a purely mechanical process of diffusion or filtration, but that it represents a function of certain living cells or leucocytes, which in the assimilation of albuminoids fill a rôle analogous to that of the red corpuscles in respiration. He assumes that the reason why peptone cannot be recognized in the blood is because it has combined with these lymphatic cells, and is, through their mediation, transported to different parts of the body; and he regards the rapid proliferation of the cells of the adenoid tissue of the intestinal mucous membrane and of

Peyer's patches as a morphological expression of the chemical processes of assimilation occurring in these tissues."

"Thus it seems," continues R. Meade Smith, "that the process of absorption is as much a vital one as that of secretion, and that the epithelial cell, or lymphatic cell, not only aids the taking of fat into the blood, but also that of peptone (changing it into albumen), and of sugar and salts."

I will mention here an assumption that I may not have made clear; the assumption is that the alimentary canal, the lymphatic system and the circulatory apparatus are empty, when we begin the study of the tissue medium. On this assumption, there is no blood in the mesenteric veins, so that absorption is impossible, and in fœtal life I have never heard that the bile acids were absorbed.

Blood—Oxygen (*Plasma, the Tissue Medium*)—The blood is the chyle. Its name is changed as soon as it enters the veins, but not its composition. The first change is produced in the lungs. Until the blood enters the lungs its composition is the result of changes produced in the alimentary canal and alimentary lymphatics, but in those organs (the lungs) very remarkable changes occur. It is important to know what influence these changes have on the "upbuild" of the tissue medium, for as soon as the blood leaves the lungs, it goes direct to the tissues, showing that no further changes are necessary, and the establishment of the tissue medium is now an established fact.

In studying this particular point, I must recall again to your memory my assumption, that the circulatory apparatus is empty. The blood which is now in the lungs is simply chyle; it has not as yet any tissue-waste in its composition. Every phenomena occurring in the blood while in the lungs results from the addition of oxygen to *chyle*. As far as I can discover, oxygen has very little influence on plasma, and having very little, I conclude the lungs have very little influence on the "upbuild" of the tissue medium; in fact, I believe it has nothing at all to do with it. This leaves this very important function (the production of the tissue medium) to the alimentary canal and the *Great Lymphatic Sys-*

tem. I say *Great Lymphatic System,* though I have so far only mentioned the alimentary lymphatics, but my explanation as to how the systemic lymphatics take part in the "upbuild" is as follows: The chyle has in its composition when it enters the lungs many substances which are still capable of producing the tissue medium; these ingredients of the chyle pass through the lungs unchanged, also through the circulatory apparatus unchanged, and form part of the composition of the plasma, which passes into the systemic lymphatics, and the glands of this part of the *Great Lymphatic System* continue the work of the alimentary canal and the alimentary lymphatics.

Although I state that oxygen has no influence on the "upbuild" of the tissue medium, I do not mean that it has no influence on its welfare; quite the contrary, for I consider it to be of the greatest importance to its welfare, for it oxidizes the injurious substances existing in the blood, which are a constant menace to it, and as a result of which oxidization these injurious substances are eliminated, whereas, without such oxidization, the eliminative organs remain impotent, disease and death resulting. These eliminative organs are the *lungs, liver, pancreas, kidneys* and *skin,* which I believe are in some manner assisted by the *spleen, red marrow of bones* and *thyroid.* Asphyxiation, on this theory, is an accumulation of non-oxidized chyle products.

In studying the functions of the individual organs, one must have constantly before his mental vision a living picture of the circulatory apparatus, the blood stream as it courses through it, and through each of these organs. The strongest argument I can present as proof of the oneness of the purpose of these organs, is the similarity of each of them in their relation to the circulatory apparatus and the blood stream.

The Lungs—The lungs *secrete* oxygen, and *excrete* carbon dioxide, water, ammonia, and some organic substances. What action they have on tissue-waste products it is difficult to tell, as we seem to know next to nothing about tissue-waste. My argument is that the lungs act on the blood before it reaches the tissues. I cannot understand an arrangement whereby an organ

is expected to permit the blood to pass through it and through the entire circulatory system, including the systemic lymphatics, before it performs its function. This is what our textbooks tell us, however, not only as regards the lungs, but the kidneys and skin, and it seems to me to be another evidence of a lack of symmetry in the structure of the organism.

The tissue-waste products, be it remembered, begin their existence outside the circulatory apparatus; although it is true we know very little of their nature, yet we do know something of the phenomena surrounding their existence; for instance, we know that there is no tissue-waste in the chyle when it leaves the alimentary lymphatics and enters the blood vessels; that before tissue-waste is found in the blood, the blood must pass through the circulatory apparatus and through the lymphatic vessels; it must follow the course I have described, so that originally it enters the lungs free of tissue-waste, and our textbooks say the lungs perform no function on the blood until it passes from the tissues.

The Kidneys—The great obstacle I have to overcome, or so it seems to me, in advancing the theory that the kidneys have an analogous function on the blood as have the liver and pancreas, is the fact that our textbooks have advanced a theory that has been accepted without reserve; so far it has never been questioned that their function is to remove tissue-waste products from the blood. My studies have led me to believe that we know very little of the nature of tissue-waste; that its secretion is entirely disproportionate to the excretion of urine, the excretion of urine being in much greater amount. I believe Dr. Carrel's experiments prove this, and I am impressed that his experiments of keeping alive tissues outside the organism proves, also, that oxygen is an injury instead of a benefit to the actual "upbuild" of the tissue medium.

The Liver—The great obstacle to overcome in attributing a similar function to the liver as to the kidneys, skin and lungs, is also the fact that our textbooks have given it a digestive function. Against this view I must call attention to the utter dis-

regard of mechanical principles such a function involves. The liver is as much a part of the circulatory apparatus as are the kidneys, certainly as much as the spleen or thyroid gland; or, if we were making general comparisons, as much a part of the circulatory apparatus as a ligament of a phalangeal joint is a part of the mechanism of a limb, and the only difference between the liver and the kidneys or the skin is the fact that the ducts of the liver open into the alimentary canal, whilst those of the kidneys and skin open into the outside world.

If we study its relation to the circulation in some detail, we find that the blood before it reaches the liver must first go to the heart, then to the lungs, then back to the heart and then to the liver. In addition to receiving arterial blood from the lungs, it drains the blood from the stomach, intestines, pancreas and spleen. This, it will be seen, draws upon the greater part of the blood, and the greater part of the circulatory apparatus, to produce bile. To me this constitutes a sufficient obstacle against accepting the liver as an organ of digestion. But worse follows. If bile is a digestive agent, especially if it is as important a digestive agent as is claimed for it, it is certainly essential for the production of blood. Without bile it would seem impossible to produce blood, yet without blood bile is impossible. Well might we ask, which came first?

In a certain sense, we know blood comes first, but it is not in a satisfying sense. The fœtus is nourished by the mother's blood, and this blood enters the fœtus before the bile, but unfortunately the bile in the fœtus is acknowledged to be an excretion. It seems strange that the same blood should produce a secretion in the mother and an excretion in the fœtus, and it seems even more strange that the food in the fœtus is cathartic to bile, and in the mother the bile is cathartic to the food. Colostrum, as we know, rids the new-born infant of the "meconium."

When we come to study the data on which our textbooks base their theory that bile is a secretion, we find this data very inadequate: "On proteids it produces no distinct action whatever, and in fact it would seem to interfere with the digestion of

proteids as begun in the stomach." "The principle function of the bile in digestion is the aid which it renders to the digestion and absorption of fats." To continue, bile is broken up, instead of acting like every other secretion, as one substance; only part of the bile digests, while the other part passes away with the fæces. This breaking up is a chemical breaking up, which means that it is not bile that digests, but some of its chemical constituents, just as though we said that water did not take part in the animal economy as water, but as its component parts, hydrogen digesting and oxygen passing away as an excretion. The fats which it digests are an unknown quantity; we do not as yet know how they benefit the system, or whether they are a benefit at all, or even if they are not an injury. The functions of the bile may be summed up by saying it is antiseptic, a stimulant to peristalsis, and an emulsifier of fats. We call them functions, but they are simply characteristics, and do not mean anything at all; certainly they do not prove it is a digestive agent. Bile might have all these characteristics, and be an injury instead of a benefit. It is not because gastric juice is an acid and contains a ferment that it digests, but it digests food and is an acid with a ferment; because ink is black, blue or red is not proof that we write with it; the coming of the blue bird does not bring the summer; because the gall bladder empties itself into the small intestine, when the stomach is full, is no proof that it empties itself to digest food more than to be itself digested by the food.

R. Meade Smith sums up a very exhaustive chapter on the subject of bile as follows: "The bile is, however, largely an excretion. Many of its constituents are removed unchanged, while some of them are reabsorbed and again enter the blood current. The mucin and cholesterin pass through with the fæces unchanged. The bile-pigments undergo decomposition in the intestinal tube, and are partly excreted with the fæces under the form of the hydro-bilirubin, a characteristic coloring matter of excrement, and are partly eliminated as urobilin by the urine. The bile salts are for the most part reabsorbed by the walls of the upper portion of the small intestine, only a small quantity of

glycocholic acid being found in the fæces. The taurocholic acid is largely absorbed, it being previously perhaps decomposed into cholic acid and taurin, the latter being constantly absorbed, while part of the cholic acid may perhaps be removed with the fæces."

The more I investigate the subject of bile, the less I see in the theory that claims it as a secretion, and I am more and more convinced that the theory was not born of knowledge accruing from investigation, but was accepted on trust. This trust has been handed down from the first investigators; they accepted it from ancient times, and every author has considered it as an article of faith ever since, as not a subject for investigation, but a conclusion into which every phenomena must fit or be erroneous. It seems like this: Bile was found in the intestine; this was proof that the ancient superstition as to its function was correct. It is pure assumption that because it mixes with food it must be of benefit, and, being present in large amount, it must be *very* beneficial. This error, or what appears to me to be an error, seems to be responsible for a large amount of the vagueness and ambiguity that exists in our textbooks.

Its clinical history is filled with contradictions also, as it must be when based on such contradictory conclusions as to its functions, whilst its treatment, if based on theory and not on practice, would border on the absurd. The symptoms of bile are vomiting, diarrhœa, nausea, headache (and a particularly distressing headache), complicated with still more distressing mental symptoms. These are the phenomena which too much of a good thing presents to the sufferer. Instead of ordering fats, we taboo them, and if we did not, the patient certainly would; instead, we order calomel, podophyllin and other cathartics to get rid of this good thing, and then we give tonics to bring it back, and failing, or imagining we have failed, we resort to bile itself, or rather to some of the bile acids, and while attempting to bring it back, we order a light diet so it will not be needed when it does come back. Unfortunately it always comes back, and we treat it as before; we never seem to learn by experience, and I do not think we ever will until we change our theory.

My conclusions are that bile (and what is true of the bile is practically true of the pancreas) is an excretion, and nature's method of expelling it (or them) from the system constitutes the one weak spot in an otherwise perfect organism.

Recapitulation—All the food that is not eventually changed into tissue medium is injurious to the system and must be removed, else it will destroy the organism. Fæces has for its analogue, carbon dioxide, ammonia, and some organic matter, urine, perspiration, bile and pancreatic fluid; the inferior part of the alimentary canal bears a similar relation to its superior part, as the circulatory apparatus does to the *Great Lymphatic System;* that peristalsis in the former is represented by the circulation in the latter; that the lungs, liver, pancreas, kidneys and skin bear the same relation to the blood as the large intestine, cæcum and rectum bear to the food; that as the mouth, stomach and small intestine are the individual factors in preparing solid food, so the lymphatic cells and glands are the individual factors in changing liquid food to the tissue medium; blood and chyle are composed of tissue medium, by-products and dead cells; the tissue medium is of benefit, the by-products and dead cells are injurious, and the organism is constructed to eliminate them; that its structure is in accordance with the highest mechanical principles, with a possible exception as to its method of eliminating bile and pancreatic fluid; that tissue-waste products, as yet, are an unknown quantity.

SPECIAL COURSE FOR LICENSED VETERINARIANS. — Dean Louis A. Klein, of the School of Veterinary Medicine, University of Pennsylvania, announces a special lecture and laboratory course extending over two weeks, beginning January 5, 1914. The course will be open to licensed veterinarians of Pennsylvania and other States. Those admitted to the course will be registered in the Dean's office, 39th street and Woodland avenue, Philadelphia, 9 a. m., January 5, 1914. Applications should be mailed before January 1, and the registration fee of $5 should accompany the application.

CONTROLLING CHICKEN-POX, SORE HEAD OR CONTAGIOUS EPITHELIOMA BY VACCINATION.*

By F. B. Hadley and B. A. Beach, Madison, Wis.

Introduction—During the winter of 1912-1913 there appeared among the poultry at the Wisconsin Agricultural Experiment Station an outbreak of chicken-pox, sore head or contagious epithelioma which progressed rapidly and bid fair to run through the fowls in all the pens. The disease greatly reduced the egg production, which is a matter of prime economic importance with every poultryman. Besides, infected birds lost vitality which they were very slow in recovering, and not infrequently death resulted. Steps were immediately taken to control the epizootic. The infected birds were given the ordinary treatment and quarantine measures were instituted; however, even with these precautions, but little headway was made, for new cases developed daily.

These disappointing results showed that the usual methods of treatment and disinfection would be ineffectual in controlling the outbreak, therefore an attempt was made to confer an immunity upon all fowls which did not show pock symptoms by injecting an autogenous vaccine. This treatment promises well and seems to have solved the problem of prevention and control.

While this work was in progress, several experiments were carried out and interesting results obtained which should be valuable to all poultrymen and veterinarians. This paper has been written to record our experimental results and to make available the technique of preparing the vaccine so that others may employ it if occasion arises.

* Presented to the fiftieth annual meeting of the American Veterinary Medical Association at New York, September, 1913.

The vaccine treatment is especially applicable in large commercial and experimental flocks, where the greatest losses are sustained and where preventive measures can be most economically carried out. Breeders of pure bred and fancy fowls whose stock would be impossible to replace should also find it valuable.

History and Occurrence—Chicken-pox has been known in this country since poultry raising became extensive enough to

be termed an industry. For how long before this we are not in a position to state, but presumably the disease has existed for many years in the southern states, where it is often rapidly fatal and assumes a very important place in the list of poultry diseases.

This disease has been particularly prevalent in Wisconsin during the past year. Early in October, 1912, several small poultry raisers in and about Madison sent hens which were sick, and others which had died from unidentified diseases, to the Agricultural College for detailed examination. A diagnosis of chicken-pox was made in several cases, from sections quite widely

separated, before the outbreak occurred in the university flocks. Chicken-pox was recognized by Professor J. G. Halpin of the Poultry Husbandry Department among fowls on exhibition at several midwinter poultry shows. He also states that the disease made its appearance in various flocks in Michigan during the winter of 1907.

Various investigators have studied this and related fowl diseases. Among the publications in American literature may be mentioned those by Ward,(1) Carey,(2) Kingsley,(3) and Haring and Kofoid.(4)

Cause—There is yet considerable doubt as to the exact cause of chicken-pox. Marx and Sticker (5) and others state that a filterable virus is the causative factor. In the beginning of the disease the blood has been said to contain the virus. Our experiments to support these inferences resulted negatively, but were limited in number and for comparative purposes must be judged accordingly.

Pox material was used by Lipschutz(6) to seed culture media with the hope that some specific organism could be isolated, but his results were not positive. Carey failed to reproduce typical sore head lesions in chickens inoculated with various organisms isolated from infectious material. Dr. O. V. Brumley of the Ohio State University has succeeded in recovering an organism or organisms from roup-infected fowls which he states will produce an immunity against roup in susceptible birds when used as a vaccine.

Much careful work has been done within recent years in an attempt to demonstrate that chicken-pox and roup are due to the same virus. Prominent among the men who have investigated this phase of the subject are Uhlenhuth and Manteufel,(7) who have contributed much valuable data to the pathology of both diseases. Schmidt(8) and Sigwart(9) have also discovered and reported interesting details.

In view of our knowledge relative to glanders and farcy, it is certainly logical to presume that chicken-pox and roup are the same disease manifesting itself in different forms. However,

differences of opinion exist among investigators on this question. Those who maintain that these are two distinct diseases think both may be present at the same time.

Pathogenicity and Transmission—Fowls show a varying susceptibility to chicken-pox, depending upon the individual and the virulence of the virus. We have been repeatedly successful in transmitting the disease by subcutaneous inoculations with a few drops of a normal saline emulsion of the virus made by freely macerating comb and wattle tissue from birds showing well-marked lesions of sore head. It is not possible, however, to reproduce the lesions by this method every time. Sometimes apparently susceptible hens inoculated as above fail to react, and control birds do not develop noticeable symptoms. This is not to be wondered at when the nature of fowls as a class is considered together with the peculiarities shown by the infection.

The incubation period varied from three to twenty days in our experimental cases. Diphtheritic membranes frequently appeared on the nasal, oral and conjunctival surfaces when the diluted virus was instilled onto them or inoculated subcutaneously.

Microscopic examination of involved epithelium from the comb showed an increase in the size of the epithelial cells which appeared to contain inclusions, and inflammatory changes in the deeper layers.

In commenting upon the significance of the various organisms which different authors have isolated from pox and roup infested fowls, Hutyra and Marek(10) have the following to say:

"The many conflicting results secured by different investigators render it improbable to attribute any specific rôle to the organisms isolated; but, on the other hand, when one takes into consideration the positive inoculation results secured with isolated pure cultures, the possibility still remains that under such special circumstances, namely, when the conditions for their multiplication in the body of the fowl are all favorable, they can occasion local diphtheritic inflammatory changes, or can less frequently produce well-defined lesions of a similar character. If one now considers the fact that the disease of the mucous

membrane can be induced by filtrates from the disease products and also by intravenous injection of such filtrates, one cannot reject the assumption that fowl diphtheria, as well as chicken-pox, is produced primarily by the same filterable virus subsequently to which facultative pathogenic bacteria attack the mucous membrane and contribute more or less to the development of the clinical picture of the disease."

Symptoms, Prognosis and Immunity—It does not seem necessary to discuss at length the symptoms of chicken-pox. Reference may be had to textbooks and the literature recited at the end of this article for details. Suffice it to say that our observations agree with the statement made by Pearl(11) that as long as the disease is confined to the skin of the head the general health of the bird is unaffected, and in most cases egg production is not interfered with. On the other hand, just as soon as noticeable lesions appear upon the mucous membranes the hens stop laying.

The recovery of this important function depends upon the individual, and the extent to which the mucosæ are involved. In some instances, not more than ten days will elapse before eggs are laid again; in other cases months may pass before the bird returns to her normal state. Emaciation in this class of cases is rapid.

A quotation from Salmon (12) substantiates our observations and experimental results and is therefore given: "In the most violent cases, especially with pigeons, the eruption extends to the mucous membranes of the mouth and nostril, the resulting inflammation taking on a diphtheritic form, and early death follows."

In the northern states, where the trouble usually occurs in the late fall and winter months, the prospect for recovery is good unless complications develop. The mortality is not great and depends to a large extent upon the condition of the birds when attacked, and the care and treatment subsequently given. Where a progressive form of the disease involving the mucous membranes occurs, fatalities are more numerous. Blindness results when the conjunctival tissue is extensively involved. This

makes it impossible for the birds to see food, and death soon follows. Carey found that affected birds may recover in two to eight weeks. He states that with good care and treatment 90 per cent. should recover, but if left to themselves 50 per cent. may die.

One severe attack is said to confer a permanent immunity. A mild attack gives but a temporary protection. It is too early to state with any degree of accuracy how effective is the immunity rendered by our vaccinations. However, the results reported by Manteufel(13) lead us to believe that it will last from one and one-half to two years.

Treatment—The vaccine treatment and prevention of contagious epithelium was first suggested and tried by Manteufel. He also found that serum from hyperimmunized fowls did not have a preventive or curative effect.

Our results with autogenous vaccines have been very encouraging, as the experiments detailed below show. It is advisable to supplement the vaccination with local treatment, especially where the typical white coating appears on the nasal, oral or conjunctival mucous membranes. A small curette has given excellent service in removing the diphtheritic membranes and accumulated pus, which cause serious trouble if not removed. The resulting raw surface is then gently swabbed with a 5 per cent. solution of potassium permanganate.

Experiments With Chicken-Pox.

I.—*Vaccination Experiments.* The vaccine used in these experiments was prepared by employing pock scabs from the skin, and diphtheritic membranes from the nasal, oral and conjunctival mucosæ. Infectious material was ground in a sterile mortar with physiological salt solution. It was then filtered through absorbent cotton and heated in a water bath for one hour at 55° C. No definite standard has been set for estimating the quantity of virus contained in a given amount of vaccine prepared as above. Variations will occur due to the character of the material used; experience will teach the strength most suitable for use.

No. 1. *Vaccine Treatment of Infected Fowls.*—Two pens containing 60 hens which had been removed from various other pens and isolated because they showed symptoms of chicken-pox were included in this experiment. Forty of these fowls were injected subcutaneously with 1 c.c. of the vaccine; the others were left for controls. The treatment seemed to have a decidedly beneficial effect, for recovery was much more rapid than in the unvaccinated controls. The disease in the latter ran a longer and more severe course.

No. 2. *Vaccine Treatment of Pox-Free Fowls.*—The fowls, numbering about 440 in 22 pens, were vaccinated with two doses at an interval of 5 days. Only 4 hens in this lot developed clinical symptoms sufficient to attract notice. It seems probable that one or more of the four was infected at the time the treatment was given. This shows conclusively the efficacy of the treatment, for less than 1 per cent. of the vaccinated fowls subsequently developed chicken-pox.

No. 3. *Control Experiment on Vaccine.*—Seventy-five white leghorns in three pens were left untreated as controls for three weeks after the disease made its appearance in these pens. At the end of this time twenty-six cases had developed, while treated fowls in other pens were protected 99 times out of 100. All birds then well were vaccinated to prevent the disease from spreading further among these birds, for they were valuable breeding stock.

No. 4. *Experiment with Small Doses of Vaccine.*—In this experiment seven hens were used. Five were given but 0.5 c.c. of a vaccine which had been prepared by inactivating for only one-half hour at 55° C.; two were left as controls, of which one developed a mild conjunctival infection after four days. All others failed to show lesions even though kept in an infected pen.

II.—Inoculation Experiments.

An endeavor was made by these experiments to demonstrate the virulence of the virus and the effectiveness of the vaccine.

No. 1. *Inoculations by Feeding the Virus.*—Three susceptible and two immune hens—one through natural infection and

recovery and one through vaccination—were fed 5 c.c. of virus emulsion by passing a tube down the œsophagus. Two of the first mentioned developed mild lesions on the oral and nasal mucosæ, and cutaneous lesions on the head, but later recovered. The third susceptible remained apparently normal, as did the "recovered" immune. A small patch appeared after three days on the tongue of the vaccinated hen, but nothing further abnormal was noted and she made a speedy recovery. Both immunes failed to develop the disease.

No. 2. *Inoculations by Introducting Virus Through the Epithelium.*—Five hens, three susceptible and two immune, as were those in the above experiment, were used to demonstrate the results of scarifying the comb and wattles and injecting the virus. All the susceptibles developed typical cases from which recovery was extremely slow. The "recovered" immune showed no lesions whatever, while the vaccinated hen developed a slight catarrhal conjunctivitis five days after having been infected, which soon disappeared.

No. 3. *Inoculations by Instilling the Virus Into the Conjunctiva.*—Four susceptible and one naturally immune hen were infected by instilling infectious fluid into the conjunctival sac. Of the susceptibles, three developed serious eye, nasal and oral lesions, from which they recovered, but the fourth only showed evidence of the disease by a slight throat inflammation which developed after six weeks and was probably secondary. The immune control remained normal.

No. 4. *Inoculations by Instilling the Virus Into the Nostrils.*—This experiment included six hens and was carried out by instilling virus into the nostrils. Three had been artificially immunized by vaccination and developed no lesions as a result of the infection. The other three were susceptible to chicken-pox and showed clinical symptoms in the throat in three, five and ten days respectively. All eventually recovered, but one was markedly emaciated even after two months.

No. 5. *Inoculation by Injecting Blood from an Infected Hen.*—One susceptible hen was injected subcutaneously with 2 c.c. of blood from an infected hen. Results were negative.

No. 6. *Inoculation by Injecting Pus Subcutaneously.*—One susceptible hen received subcutaneously 1 c.c. of purulent material from hens sick with chicken-pox. This bird died suddenly after seventeen days from asphyxiation. Autopsy revealed a mass of pus which completely occluded the entrance to the trachea.

No. 7. *Natural Infection Observations.*— (*a*) A game cockerel, susceptible to chicken-pox, was placed in the fattening shed, where the infection had previously appeared, with other roosters which had been vaccinated and were immune. Scratches on the head from fighting became infected and the bird developed a well marked case, including mouth and throat lesions, from which he died on the twentieth day.

(*b*) A white rock cockerel which had never been vaccinated was placed with treated hens in an infected colony house. He developed a typical case, both comb and mouth symptoms, but finally recovered. None of the hens became infected.

III.—Filtration Experiments with Virus.

In this work Chamberlain filters were used to filter the salt-emulsion-virus, which had been prepared in a manner similar to that used in the previously recorded experiments. All bacteria were excluded, as was shown by microscopic and cultural tests of the filtrate.

Experiment No. 1.—In this experiment eight non-immune hens were employed. They were divided into two lots of four each. One lot was isolated and infected with the filtrate by instilling it into the eyes, nose and mouth. The other hens were used as controls and similarly inoculated with the unfiltered virus. No lesions developed in the hens given the filtrate. One hen in the other lot had a mild attack after two weeks, the symptoms being confined chiefly to one eye.

Experiment No. 2. Six susceptible hens were employed. Three were given instillations of the filtrate into the eyes, nose and mouth. The other three were used as controls and inoculated with the unfiltered material. The experiments turned out unfortunately, for none of the hens developed lesions.

These experiments with filtered virus are limited and by themselves fail to demonstrate that chicken-pox is caused by a filterable virus, because the controls did not develop typical lesions. Possibly the hens had considerable immunity as they were all from one source. Further work along this line is planned and duplicate experiments will be carried out soon.

Conclusions.

1. An autogenous vaccine has proved successful for treatment and prevention of chicken-pox. But results were obtained by two doses. The vaccine is especially applicable in large commercial and valuable breeding flocks when used before pathological changes become marked.

2. The vaccination treatment for chicken-pox was most valuable when used as a preventive, where it was effective in fully 98 per cent. of the cases.

3. One attack conferred immunity. The immunity which resulted from the vaccination is estimated to be effective for one and one-half to two years.

4. It was found impossible to transmit the disease at every attempt, due to certain peculiarities of the virus and the fowls. When the attempts were successful, the disease ran a benign course; as it also did in the few cases in which it made an appearance after vaccination.

5. Experiments to show that chicken-pox is caused by a filterable virus resulted negatively.

6. Although the identity of chicken-pox and roup has not been definitely proved, the similarity of these diseases is so great that it seems possible to control roup by vaccination.

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PHYSIOLOGIC PRINCIPLES IN THERAPEUTICS.*

By Pierre A. Fish, Ithaca, N. Y.

The comparatively recent use of more exact scientific methods in clinical work has brought about a much closer relationship between physiology and practical medicine.

In the ultimate analysis the majority of diseases can be traced to a disordered condition of metabolism or tissue change. In some instances the disease may arise from disordered digestive processes or the production of substances more or less toxic which interfere chemically with normal metabolism. In other cases it may be due to the invasion of a foreign organism or a substance produced by it, as in tuberculosis or tetanus.

Recent physiologic research shows that there is an intimate chemical relationship between certain portions of the body with others and that, in all probability, there is more or less chemical relationship between all parts.

Since the time of Sir Charles Bell it has been maintained that the normal functions of the body are carried out through the nervous mechanism; that certain parts apparently more or less isolated are all under nervous control. Starling and Bayliss have shown by their discovery of the hormone secretin, in the mucosa of the intestine, that the chemical relationship is quite as important as the nervous in the digestive processes. The recognition of the chemical factor in regulating and controlling certain of the bodily functions is being extended. The active principles or hormones of the internal secretions of certain of the ductless glands produce their effects in a chemical way and their importance is shown by the fact that serious results follow their removal.

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The use of drugs in the treatment of disease is founded upon the belief that they may chemically influence certain functions of the body. Such a belief seems rational when evidence is accumulating to show that the body itself is able to produce chemical substances with which to regulate or modify its various functions. It is, furthermore, reasonable to use for therapeutic purposes those agents which enable the body, when in health, to perform its functions normally.

The importance of the nervous factor in physiologic processes is by no means lessened, but the honors heretofore accorded to it must in many instances be shared with the chemical factor. In primitive conditions, and because in the sequence of development the nervous tissue is relatively late in its appearance, the chemical factor assumes still greater importance. The results produced by the excitation of protoplasm follow chemical changes whether the stimuli be of chemical origin or not, and the reaction is relatively slower than that produced by the nervous factor in later development.

The nervous and chemical factors are not antagonistic but co-operate harmoniously in the work that is to be performed. An example of this co-operation is well shown in the production of the digestive juices. The salivary secretion may be induced through the nervous mechanism before the food has actually entered the mouth. Although the taste of the food may initiate the flow of the gastric juice, its continuance is effected by chemical stimuli derived from the pyloric secretion. The production of pancreatic juice, according to recent investigations, seems to be due entirely to the chemical stimuli furnished by the secretion formed by the mucosa of the duodenum. A series of events has therefore taken place originating in the nervous mechanism and merging into a chain of chemical reactions which do not antagonize but supplement the nervous activity.

In the consideration of the normal and diseased conditions it is of great importance not to overlook what might be termed the internal work of the body or those activities which are essential for mere existence. The vital activities centre largely

around the heart and the work it can do. Under normal conditions the energy required to drive the blood, loaded with nourishment, to the tissues, and the amount of waste products poured back into the blood by the tissues, represents many foot-tons of work during the twenty-four hours. If the action of the heart or circulation be interfered with by disease the work is proportionately increased until a condition may arrive when the heart is unable to support any further work from external sources and the patient must submit to a life of inactivity until finally the internal work of existence is overcome. Similarly in regard to the work done by the muscles of respiration in enlarging the diameters of the chest in order that the blood may be properly oxygenated. Normally, the work is considerable, but if interfered with by pathologic conditions, the daily output of energy is greatly increased.

Undoubtedly the greatest item in internal work is the production of heat. The normal work of the heart and respiratory muscles involves the liberation, as a by-product, of more than twice as much energy in the form of heat as is actually required for the mechanical work of the circulation and respiration. All living cells, from their chemical changes, contribute to the production of heat. If the cells excrete temperature as a by-product of their activity, it will follow that cells unduly active will produce a greater amount of temperature, and if prolonged will result in fever; whereas cells of a low degree of vitality would produce less heat and represent a smaller expenditure of energy. As long as a cell is alive it performs the duties of metabolism and produces more or less heat. The duration of life and the various types of temperament are probably referable to metabolism. With a nervous and excitable temperament and a life period perhaps below the average, we may associate cells with rapid metabolic processes; with a mild and phlegmatic temperament and a life period beyond the average, we may assume that a greater economy exists in the metabolism of the cells and their normal processes continue for a longer period.

Life and heat are inseparable. If the temperature of the

blood rises, tissue waste must be increased. Fever, therefore, tends to have a destructive effect upon the cells, whether it be primarily due to an increased production of heat, to a diminution of loss of heat, or to a disturbance of the normal balance between the two. If it is desired to lower the temperature in fever, the easiest method is to increase the amount of heat loss, because this is more under our control than heat production. Cold baths, for instance, act by removing heat from the body surface by conduction; sudorifics, by increasing evaporation. Our knowledge of the drugs which diminish the amount of heat production is limited. Alcohol, in large doses, appears to do so, probably from its paralyzing effect upon the cells. Quinine, in retarding the metabolism of the cells, seems to have a similar action. Some antipyretics appear to increase the loss of heat by dilating the superficial blood vessels and so increasing the amount of radiation from the body; while some others appear to have some action upon the heat-regulating centres which have more or less control of the heat-regulating mechanism.

Although the energy of the body is derived from the food, not all of the energy inherent in the food is available for metabolism. Some of this energy is utilized during the digestive processes in preparing the food for absorption and assimilation. It has been calculated in the case of a horse fed entirely upon hay that 48 per cent. of the energy of the food is expended in its digestion and absorption. There is also a variation according to the chemical constitution of the food. Proteins seem to demand more energy, carbohydrates less, and fats still less. Milk, the common food of all animals in their infancy, requires the least digestive work. During the period of infancy the digestive enzymes have not reached their full period of development, and although able to digest milk for tissue use, they are unable to act upon the more concentrated foods in a satisfactory manner.

Carbohydrates and fats furnish the greatest amount of energy to the body. Protein may intermittently or accidentally contribute to the energy produced, but its chief function is to replace the nitrogenous material in the tissues. Under certain conditions

a greater amount of protein may be retained in the body; this is exemplified in pregnancy, where it is utilized to contribute to the formation of the fœtus and the increased growth or hypertrophy of the uterus and mammary glands. Likewise in convalescence from acute diseases where wasting has occurred, the tissues possess the property of retaining a larger amount of protein, in order that the normal weight and size may be regained at a relatively rapid rate.

In the body, carbohydrates are converted into sugar and a portion of the sugar may be converted into fat. Clinically there is some evidence that there are cases where the conversion of carbohydrate into fat is not well developed, and as a result of the imperfect assimilation pathologic changes may occur. In some cases of glycosuria in elderly subjects the question has arisen if the condition may not be due to the sugar passing away through the kidneys instead of contributing to the formation of fat; in other words, the patient is a diabetic because he has not laid on fat.

The control of the size of the blood vessels by means of the vaso-motor nerves has a direct bearing upon the conditions of engorgement and congestion. At the present time the balance of evidence is opposed to the view that the pulmonary blood vessels are supplied with vaso-motor nerves. This, perhaps, accounts for the ease with which these vessels become the seat of passive engorgement when there is any obstacle to the outflow of blood into the left heart. In this way the lungs may serve as a reservoir for the pulmonary circulation in much the same way as the liver and spleen serve in a similar capacity for the systemic circulation. A condition of passive congestion, therefore, plays a large part in pulmonary diseases. During the expansion of the lungs in inspiration the pulmonary capillaries are increased in calibre and the circulation through the lung is facilitated. During expiration, on the other hand, the vessels are diminished in size and the circulation is more difficult. This is one reason why a patient whose pulmonary circulation is interfered with tends instinctively to keep the chest as much as possible in the position of inspiration. The absence of a vaso-

constructor supply to the pulmonary arteries also implies that adrenalin (which acts on the terminals of such nerves) can be of no use in checking hemorrhage from the lungs.

The bronchial artery supplies the pulmonary pleura, and the internal mammary and intercostals the parietal pleura, while the venous blood is carried away from these parts by the azygous veins. These veins are imperfectly supplied with valves; therefore, when the pressure in the right heart is raised, the venous roots in the pleura become quite readily congested and effusion or hydrothorax results. The vessels in the pleura differ from the pulmonary vessels in that they are supplied with vaso-constrictor nerves. They are, therefore, more susceptible to the action of adrenalin, and advantage has been taken of this fact in the treatment of pleural effusions.

The blood normally varies considerably in the proportion of its constituents. A diminution in the amount of its fluid causes greater concentration, an excess of red corpuscles and an increased viscosity. Gustave Mann has calculated that the maximum number of corpuscles which the human blood is capable of holding is 13.9 millions. A blood count of 12,000,000 must imply a very great increase in the circulation time through the capillaries. Anything which increases the stay of the blood in the capillaries permits of the abstraction of a greater amount of oxygen from it and therefore contributes very materially to the production of cyanosis.

It is becoming more and more evident that no single organ lives unto itself alone, but that the chemical changes which take place in each may be of great importance to metabolism as a whole and to the normal interchange in other organs. Although the chemical products of every organ must influence the conditions of the body to some extent, it is only when the influence is specific and the origin definite that the substance is entitled to designation as a hormone—a substance which excites chemically.

Aside from nutritive material there are, according to Ehrlich, two groups of substances which affect the body. The first group —the toxins—are closely allied in their chemical character to the proteins and are produced through the agency of living

organisms. As a result of their introduction, the tissues react by the development of an antibody. The second group includes all of the common drugs, which probably act upon the protoplasm because of their molecular arrangement, producing their effect upon the cells quickly and without a period of incubation. Although repeated doses may, in some cases, set up a certain degree of tolerance, an antibody is not produced. Hormones may be assumed to belong to the second group, because if they produced antibodies, larger and larger doses would be required to perform their physiologic functions and this would defeat their own object. Hormones may therefore be regarded as belonging to the permanent, and not to the acquired, defenses of the body.

According to Langdon Brown, the general features of hormones may be stated as follows: (1) They are bodies of comparatively small molecular weight; (2) unlike ferments, they are not destroyed by simple heating, but may lose power on prolonged boiling; (3) they are rapidly destroyed by oxidizing agents; (4) they are destroyed in the tissues which they excite and do not escape in any of the excretions; (5) they are not, as a rule, absorbed unaltered from the alimentary canal. Iodothyrin, the active principle of thyroid extract, is an exception to this rule, probably because the thyroid gland originally discharged its secretion into the alimentary canal by the thyro-glossal duct.

In a practical way, it would appear that typical hormones should be employed only by local application or injection; since they can be added to boiling water without loss of strength, the question of sterilization is much simplified; that as they disappear, probably by oxidation in the tissue they excite, they are more useful in producing temporary rather than prolonged effects. The following table modified from Starling gives the more commonly recognized hormones:

Origin.	Hormone.	Reacting Organ.
Suprarenals	Adrenalin	Sympathetic nervous system.
Stomach (pylorus)	Gastric secretin	Stomach (fundus).
Duodenum	Secretin	Pancreas, Liver.
Thyroid	Iodothyrin	Nervous System, Skin, etc.
Ovaries		Uterine mucosa.
Fetus		Mammary gland.
Gastric Mucosa	Hormonal	Intestinal musculature.

Adrenalin is a chemical body whose presence is apparently essential to the activity of the sympathetic nervous system. Langley has made the important generalization that the action of adrenalin on any part is the same as stimulation of the sympathetic nerves to that part. This is of especial interest in view of its formation by a structure of sympathetic origin. The most striking action of adrenalin is the rise of blood pressure resulting in part from the constriction of the vessels. This effect is not common when taken by the mouth, probably because its absorption is largely prevented by the vaso-constrictor effect upon the vessels of the gastric mucosa. For this reason it has been used successfully in checking hemorrhage from the stomach, and for the relief of vomiting. Its action upon the stomach would also suggest its use for hemorrhage of the intestines. It has apparently been so used with some success, but the fact that adrenalin, like the sympathetic, checks peristalsis and tends to close the sphincter muscles, makes it somewhat doubtful if it can get by the pylorus. Exner has found that the intraperitoneal injection of adrenalin delays the absorption of a poison introduced into the stomach or peritoneal cavity; thus strychnine required twenty times as long to produce its toxic effect. This gain of time is most valuable, and suggests the administration of a full dose of adrenalin pending the use of other remedies.

In addition to its vaso-constrictor effects, adrenalin is a powerful stimulant to the heart, augmenting its action like the sympathetic, but intravenous injections must be used to produce this action. In azoturia, "heart failure" may occur as the result of the production of toxic substances in the tissues; with this condition it is not unlikely that vaso-motor paralysis prevails and the use of adrenalin should be of benefit in raising the blood pressure as well as stimulating the heart. Occasional reports of the successful use of adrenalin in this affection may, perhaps, be explainable on this basis.

Accepting the general view, that vaso-motor nerves are absent from the pulmonary and cerebral vessels, adrenalin would be contra-indicated in the treatment of hemorrhages from these

parts, because its action in constricting vessels elsewhere would cause an increased flow of blood to these areas and thus aggregate the hemorrhage. The tendency of the blood to collect in those areas which are not supplied with vaso-motor nerves following the intravenous use of adrenalin, should be kept in mind especially if those areas are diseased.

The first and most conspicuous triumph for organo-therapy was treatment by thyroid extract. From its great success in myxœdema and cretinism, iodothyrin may be regarded as a hormone having a specific action on the central nervous system and on the skin and subcutaneous tissue. The effect of thyro-iodin on metabolism is to reduce weight, only one-sixth of the loss being due to increased nitrogenous waste, the remainder being due simply to the diuresis it causes, apparently by dehydration of fats.

One of the more recently described hormones * still in the experimental stage has been designated hormonal. It is found in the gastric mucosa of all animals thus far examined at the time when the digestive process is at its highest, but it is obtained in sufficient quantity only in the spleen. It is suggested that the gastric mucosa produces this hormone and the spleen stores it up. When injected intravenously or intramuscularly, it produces an energetic wave of peristalsis beginning at the pylorus and passing throughout the length of the intestine. Therapeutically it has been recommended in cases of chronic constipation and acute intestinal paresis. Its injection is usually followed by a transitory rise of temperature. It may be distinguished from cathartics in that it causes intestinal peristalsis comparable to the physiologic process and, in those cases which respond, its action is said to be of some permanency or at least of long duration.

In general, organo-therapy or hormone treatment may be considered in suitable cases to be more specific than drug treatment, in that it inaugurates or maintains conditions very similar, if not identical, with the normal physiologic processes. As drugs

* Dohr, Marxer and Zuelzer, Berliner klinische Wochenschrift, 1908, No. 46.

have active principles of much therapeutic value, so physiologic research is demonstrating that in hormones, certain, if not all, of the organs of the body have also their active principles which act upon body areas more or less distant, and in a few instances have shown great therapeutic usefulness. With continued research it is probable that our knowledge of the hormones and their use in therapeutics will be greatly extended and the bonds uniting physiology with medicine will be knit still more closely in the future.

THE NATIONAL HORSE SHOW OF AMERICA had a very successful season at the Madison Square Garden, New York, the third week in November. The old garden never looked better, and probably never housed a better lot of equine aristocrats. The saddle and heavy harness classes seemed to hold the interest of the railbirds (the real enthusiasts of the show) closer than any others, unless perhaps the high jumpers. This association is surely a great stimulus to breed good ones, for only very good ones can get a look in at the prizes. The championship contest for saddle horses on the last afternoon brought together the *creme de la creme*, and this class (mostly mares) showed some beautiful types. The heavy harness horses brought together in the ring in the championship contest, represented the finest in this country, possibly in the world, and made one's heart bound at the thought of again seeing our parks teeming with them as in the past. An especially inspiring feature of the show during the past few years is the race between coach teams for the Arrowhead Inn Challenge Cup. The cup this year was won by Mr. Emil Seelig, of New York, whose lusty four-in-hand consisting of Big Tim, Flying Gyp, Montclair and Tenafly, made the run from the Inn to the Garden, a distance of nine and a half miles right through the heart of the City, in thirty-six and a half minutes. His competitor had one or two mishaps, such as a horse falling, a broken poll-chain, etc., and reached the Garden twenty minutes later. These imposing outfits, with a cock horse trailing, made the automobiles along the route appear very insignificant by comparison.

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VETERINARY SCIENCE FROM A COUNTRY PRACTITIONER'S VIEWPOINT.*

By J. F. DeVine, Goshen, N. Y.

At this time when mechanical devices are supplanting in so many ways the various duties that we previously asked our domestic animals to perform, the general aspect to the veterinary practitioner must necessarily be somewhat changed. This is particularly so with the class of men who have chosen the city as a place of practice. It is needless to attempt to enumerate all that the steam and electric railways and the automobile have done to supplant equine service in certain localities.

It seems but yesterday that the one subject that received most attention in the veterinary schools was the horse, and young men were wont to flock to cities where wealth made it possible to receive large fees, particularly in districts where the high-class carriage horse, the thoroughbred and the gentleman's roadster or trotter abounded. The owners of these animals were usually men of much wealth and were willing to pay liberally for skillful attention given to their animals. Those who have had experience in large city practices know full well that a veterinarian a decade ago might have been an equine specialist and carried on a lucrative practice in cities where his work consisted largely of examinations for soundness, lameness, green sickness, pulmonary affections and injured feet. Times have changed. The lavish expenditure upon the equine idol at such places as Saratoga and Sheepshead Bay in New York State, and similar places in many other states, is but a thing of memory. The heavy harness horse is now replaced by the limousine automobile; the electric auto and lighter cars are transporting and taking up the attention of the people who formerly were admirers and drivers of the lighter road horse; auto trucks are supplanting the draft horse, and it

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is plain to see that the future veterinarian must be capable of taking a more active part in agricultural and municipal matters, such as meat and milk inspection, and in general sanitary control work, with view of guarding against the transmissibility to the human family of communicable diseases and the prevention and suppression of animal plagues the ravages of which, if allowed to take their course, would in all probability soon shatter the very foundation of that important factor of our nation's wealth, the livestock industry.

In agricultural matters the veterinary practitioner to-day must not only be a practical horseman but he must meet the requirements of a broader term. He must be a practical stockman. His training should be so broad that his advice will be sought on feeding and dairying problems. He should be able to advise his rural clients as to the proper type of animals for breeding purposes, the proper nourishment for growing the young, or balanced rations for the greatest production in the adult. He should likewise be able to discuss intelligently such matters as rotation of crops, their relative nutritive value, etc.

Allowing that the horse is still possibly the most important factor to the general practitioner, we will need to wend our ways ruralward if we are to continue to attend to his needs. Statistics show that there are approximately twenty-four million horses in the United States to-day and that about three-fourths of them are on the farms.

Lest it would appear from what I have said that the day of the horse's usefulness has past and its value become unworthy of attention, let me remind you that perhaps there never has been a time in the history of our country when its value was greater, or its services more in demand.

While the evolution which we have cited has been going on new avenues of occupation have been added to some of the old. While the price of trotter and the show horse is to-day, as in the past, governed largely by the quality of the individual and the wealth of the purchaser, the price of the draft horse and the general utility horse have steadily advanced. This has been

augmented in a measure by the lack of supply of horses of a satisfactory type and quality, when horse breeding became unprofitable several years ago. Here, again, is where the veterinarian should be the guiding star of the breeder, and here is where proper stallion registration laws, at this time when horse breeding is sure to revive, would be of inestimable value to our country.

We as veterinarians should point out to the breeder the absolute necessity of selecting sires not only of a desirable strain but of a desirable individuality. Using a sire simply because he is eligible to registration, or possibly is registered, reminds me of an expression of a breeder of Holstein cattle. He said that some people in selecting a bull to head their herd would lay great stress upon getting a registered animal and that ordinarily that was about all that some of them did get. And added, " that some of the registered sires ought to have a certificate of burial rather than a certificate of registration."

The same holds good with our horse breeding; we want good blood lines and we want good individuals. In fact, a pure bred defective animal is more dangerous than a scrub, as he is far more apt to be prepotent and stamp his offspring with his defects. It is our plain duty, so far as we can, to assist in discouraging the breeding of animals with naturally vicious dispositions, particularly females; likewise animals of faulty conformation such as narrow chests, long, washy barrels, defective feet, curby or beefy hocks or those suffering with hereditary spavins, ringbones and like unsoundnesses.

With the ever-increasing population of our cities and the systematizing of municipal governments, two comparatively new necessities have been added to the calling of the veterinary profession, namely, state and municipal meat and milk inspection.

The necessity and advantages of state and municipal meat inspection is daily receiving more and more attention. The public are beginning to grasp the fact that Federal inspection, even with all its splendid system and force, looks after only about 60 per cent. of the meat consumed by us, and that the greater

part of this so inspected is for the protection of the other fellow and not for the small consumer, who is at the mercy of the unscrupulous local butcher who may slaughter an animal suffering with any such dangerous or disgusting diseases as advanced tuberculosis, cancerous organs or extensive suppurative areas or the like. When after stripping the diseased parts the remainder of the carcass is sold to the helpless consumer. It is truly a blessing to mankind that it is usually customary to subject meats to some form of cooking before eating under such conditions.

State and municipal meat inspection, when conducted under capable veterinary supervision, should excel federal inspection, since in most cases it would be possible to carry out ante-mortem examination as well as post mortem.

Meat inspection is truly a noble service, and the truism, " He serves his own interests best who works for the common good of all," was never more applicable than in this work.

Milk Inspection.

In certain Eastern countries, where babies are usually nursed by their mothers somewhat longer than in this country and are weaned gradually upon farinaceous and miscellaneous diet, they get along very nicely without the use of milk; but we have learned to look upon cow's milk as a most useful food for adults and practically a necessity for infants, particularly among classes where breast feeding is becoming undesirable or impossible. The wonderful merits of milk can only be realiezd when we understand that it contains all the elements necessary for growth and development in the young, and that it is the only single article of food which is complete enough in itself to sustain life for a very long period.

While normal milk drawn from a healthy cow and properly cared for is so valuable, still we have learned to know that dyphtheria, scarlet fever, typhoid fever, tuberculosis and other diseases may be spread by milk, and that stale warm and bacteria-laden milk is especially dangerous to young infants, and that some widespread epidemics which were formerly attributed to water,

air and other causes are now found to be due to milk. As a noted writer has well put it, to separate the mouth of the baby from the teat of the cow by several hundred miles is often a serious matter to the baby. Nature probably never intended the milk of one animal to be used by the young of another, but since it seems to have become a necessary custom with us, it has brought with it also the necessity of skilled supervision in order that it may be useful rather than harmful.

Cities are fast beginning to learn that even with their beautiful parks and boulevards, clean streets and similar ideal conditions, the health question is only half solved. No city can remain healthy unless it takes into account the health of the country from which it obtains its food supply. It is interesting to note that at one time there was much more disease and much higher death rate in the city than in the country. The tables have now been turned, for there is less chance of contracting infection in the well ordered city than in the average country place. For a long time people did not know how to live huddled together in large communities; fads and fancies ruled the day in matters hygienic; people partook of polluted water without a question. In fact it took them a long time to find out that the inexpressibly nasty habit of drinking water defiled with sewage was dangerous as well as not nice. To-day our larger cities have a fairly satisfactory and clean water supply and the removal of waste is steadily showing improvement, but they must still get their milk from the country, and in many instances hundreds of miles away. For instance, New York City uses about one million six hundred thousand quarts of milk daily, and in order that this river of milk may reach the consumer in a palatable and nutritious form, it must be carefully guarded from the cow to the mouth of the consumer. In carrying out this protection our object should also be to enlighten and educate and not frighten. There is a temptation on the part of the popular exponents of science toward overstatement. This is not necessary; we will find that when all indictments are brought together that milk is criminal enough without any exaggeration. The great difference between milk

and most other fluids, in that bacteria tend to grow well in milk and die in other fluids, adds to its seriousness if improperly handled.

We must not lose sight of the fact that the protection of our milk supply is like many other problems in preventive medicine. It lacks the dramatic effect. The rank and file of our people do not seem to grasp the fact that to prevent sickness and suffering is nobler than to administer in an unnecessary illness. We must disabuse the public's desire for glowing headlines in our public press as evidence of progress. It is common knowledge that tuberculosis exacts an annual toll greater than the number killed by bullets in the four years of our Civil War; yet compare the stir caused by this knowledge as to that caused by even the suggestion of war. The final solution of the milk problem will require mutual co-operation between the producer and handler, the consumer and the inspector. The veterinarian, by training and impartiality, should play a very important part in the realm of adjustment and protection.

So much for the general condition of veterinary matters as we see them to-day. But there are still some other very important sides of our veterinary problems that are largely within our own command. I refer to the educational side, the interchanging of knowledge, so to speak. I care not how skilled a practitioner may be, there are times when we will meet cases that are so wanting in true characteristics or so confusing in symptomatology as to make a definite diagnosis unwarranted; and if we are conscientious men, as we should be, it is then that we turn to the man who by special training and equipment can assist us in solving the problem and make it possible for the practitioner to serve his community to a better advantage. I fear the general practitioner is not always as appreciative of the assistance he receives from laboratories as he should be, and I doubt if we have all done our share in assisting the laboratory man to be the greatest possible good.

When we stop to consider how absolutely helpless we oft-times are when called upon to investigate an epizootic or enzootic

presenting symptoms or characteristics with which we are not familiar, how we ofttimes have to grope aimlessly and hopelessly around in the dark. True it is that occasionally we may trace the cause of our trouble to some dietary error or local conditions, but more often we are apt to seek the assistance of the laboratory man either in determining the causing factor, or giving us reasonable assurance that we are not dealing with a contagious plague. I think it can be truly said that most of us who err in giving assistance do so from lack of knowledge or carelessness rather than with any malicious intent. If, for instance, we should wish the brain of an animal examined owing to the fact that during life it exhibited certain nervous phenomena the cause of which we were not certain but had in mind the possibility of rabies; we should not expect the laboratory man to patch together a masserated hypo-camp that had been mutilated by force. It would be still more hopeless to expect animal inoculation of the brain lesions to verify the microscopical work, had putrefaction set in, or if disinfectants had been used as a preservative rather than cold temperature. These same principles hold true in sera diagnosing the examination of organs, neoplasms and the like. The proper method in securing of an organ or a tissue for examination and still further proper preservation of same until it reaches the laboratory will gladden the heart of the laboratory man and bring to us more satisfactory answers.

The present outlook for the properly educated and trained veterinarian is as bright if not brighter than ever before. A little over half a century ago the number of educated veterinarians on this continent could have been counted on the fingers of one hand. The profession was then represented principally by graduates from foreign shores and a few so-called self-educated men, the later who, through their love for animals and interest in the alleviation of suffering, made a special effort to administer to the dumb brutes as intelligently as their knowledge acquired by books and experience could warrant. We have nothing but praise for our old graduates and the honest, well-meaning non-graduates, but we must likewise admit that our profession at

that time was overwhelmingly represented by the type of men pitifully wanting in ability and conscience. I remember as a youth looking on with boyish terror at the cruel, barbaric treatment our stock was subjected to from time to time. It is not a matter of ancient history when the self-exploited veterinarian bored holes in the cow's horn and filled them with turpentine, or poured melted lard in the poor, suffering animal's ears after a wise diagnosis of horn distemper. Similar cruel treatment was sure to be the lot of the animal that through illness of any kind showed a flaccid condition of the tail, when a jackknife would be sharpened on the bootleg, the tail split and the opening filled with pepper and salt, which would make the animal squirm and thereby show evidence of great and suddenly reviving life. We should rejoice that the days of empiricism are passing. The public, recognizing the necessity of a scientific administration to the dumb brutes similar to that being administered toward the alleviation of pain and suffering in the human family, encouraged the fathers of veterinary medicine in this country, and these good men, withstanding all the trials and vicissitudes, scorn and criticisms that were cast upon them, slowly through their since efforts brought up the standard of the veterinary profession until to-day it is looked upon in most states as the equal in every way to other professions such as medicine and law. Young men of refinement and education have been induced to enter the profession. Veterinary schools of magnificent type are being built, where an education quite in keeping with that of any other profession is available for veterinary students. As our veterinary profession has grown, associations and membership have multiplied, until to-day nearly every state, territory and province in this country can boast of one or more veterinary associations.

Veterinary Societies.

All veterinarians should support and take active interest in veterinary associations; they first, last and always stand for better education and better organization, to the end that we may better serve mankind, the brute creation and the livestock industries of our country.

Veterinary societies are a benefit to every veterinarian; I care not whether he be a specialist or a general practitioner, the very atmosphere of these gatherings is pregnant with knowledge and suggestions that are sure to develop a thought or clear a problem that heretofore never occurred to us, or on which possibly our knowledge had been too meagre to be of any value to us.

While I have said but little concerning general practice, this in my judgment is perhaps the most important branch of veterinary science.

I have the greatest respect for the chemist, bacteriologist, and biologist. Without them I fear that medicine and veterinary medicine would stand still or make progress discouragingly slow. Think of the evolution in the practice of medicine that these men have brought about. The future limit of serum therapy, antitoxins, phylacogens and vaccines no man dare predict; but, again, we must not lose sight of the fact that the practitioner is the man who must make use of any apply this and like knowledge, if these preparations are to reach the fields that they were primarily intended for. Expert knowledge kept in laboratories or experiment stations would do the world at large but little good.

In conclusion, it is my judgment that veterinary education is in the era of ascendancy, and if we are to continue to make progress it behooves us to be thorough students in all matters pertaining to the class of work in which we are laboring. Honesty with ourselves and our clients, our work and our results, are good watchwords for the onward march of the profession that each member should support and add to its usefulness.

DR. HIGGINS TALKS ON ANIMAL DISEASES AT HARVARD MEDICAL SCHOOL.—Dr. Chas. H. Higgins, pathologist to the Dominion Department of Agriculture for the past fifteen years, delivered a lecture (according to the Boston *Globe*) at the Harvard Medical School on Sunday, November 15, on "The Protection of Animals Against Infective Diseases." Dr. Higgins, who took his veterinary degree at McGill University, is also a graduate of Massachusetts Agricultural College.

GENERAL EDUCATION IN REGARD TO GLANDERS AND PUBLIC DRINKING FOUNTAINS.*

By Dr. B. T. Woodward, Quarantine Division, U. S. Bureau of Animal Industry, Washington, D. C.

Glanders is a subject of ever active interest to the veterinary profession, and many papers upon glanders are written and discussed by its members.

An important adjunct, it would seem, is a general education of the public, and especially of representatives of humane associations and of the police forces of the cities and towns to which are assigned the duties of preventing cruelty to animals. The American Humane Association recognizes the importance of this aspect of the glanders problem, and upon its request the writer presented a paper upon this subject at the 36th annual meeting of the Association, which was held in 1912.

An intelligent understanding among horse owners and the special classes of people already mentioned would assuredly be of great benefit to the live stock authorities in controlling glanders, and woud lead to greater harmony in the enforcement of necessary legislation.

This paper does not purport to contain new information for the veterinarian, but endeavors to present the subject of glanders for the consideration of the people who are interested in horses and their welfare. The layman should understand that up to a comparatively recent time glanders and farcy were considered to be two distinct diseases, and that we now recognize them as a single disease known as glanders, of which farcy is but the designation of the skin symptoms.

Glanders is a dangerous communicable disease of horses, asses and mules, prevailing in various extents in the majority of

* Presented to the fiftieth annual meeting of the American Veterinary Medical Association at New York, September, 1913.

the countries of the world. It is probable that no State of these United States is entirely free from the disease, and the greatest number of its victims are claimed in the cities, rather than in country districts.

Although glanders shows such a marked predilection for equines it is readily communicated to man, dogs, cats, rabbits and guinea pigs. Fortunately, however, it is practically impossible for cattle or chickens to contract the disease, and it is rare among sheep and goats.

It is one of the earliest recognized diseases, for Hippocrates, about 450 B. C., and his follower, Aristotle, gave it a distinct place in their writings. From the fourth century to our era it has appeared in veterinary writings, with a recognition of its contagiousnes, which has been so well and frequently demonstrated by the repeated outbreaks in the cavalry of European countries and its appearance in previously free localities following the invasions of war or civilized commerce.

It awaited our present generation, however, to discover the cause of the disease, and in 1882, Loeffler and Schutz, in Germany, isolated the specific germ, which they described and named " Bacillus mallei." We should realize then that no case of glanders exists or can be contracted unless the affected animal has come in contact with and harbors this one distinct form of germ life, the Bacillus mallei.

This organism is found principally in the nasal discharges, the pus exuding from farcy buds, and in the saliva and manure. From these sources other materials are infected by contact, making them secondary carriers of glanders. Among the secondary carriers for the dissemination of glanders which are thus produced there may be mentioned the public or common watering troughs, mangers, nose bags, harness, curry combs and brushes, stable attendants, wagons, public hitching sheds and posts, blacksmith shops, and access to manure piles.

The factor of greatest importance is the direct contact of healthy horses with glandered horses affected with the disease in an acute form. The contagion is in its most virulent form in

acute cases, and the infected discharges invariably produce glanders when inoculated into animals of a susceptible specie.

The discharges from old chronic or semi-latent cases are not nearly so active and dangerous, but they should never be overlooked as an important source for the dissemination of the disease.

Having gained entrance into the body variable periods extending from a few days to years may elapse before the appearance of lesions of the disease. Experimental inoculations have however demonstrated by postmortem examination that internal lesions have developed in from one to three weeks after inoculation.

Workers in humane societies and others associated with horse welfare should have a general knowledge of the visible symptoms which are presented by glanders during its development. Through this knowledge they will in many instances be able to diagnose clinical cases of glanders as they appear among horses upon the street, in public sale stables and other places, and thus be very valuabe aids in determining centers of infection and co-operating with health officials in eradicating the disease.

Glanders develops more rapidly and more frequently in the acute form in young horses than in old. The rate of development depends largely upon the age of the horse, its general vital condition, the character of feed and work, and the appearance of general fevered conditions or local injury.

A well-fed horse subjected to work which never exhausts it may be affected with latent glanders for years, showing no symptoms which even point to suspicion. The first symptoms to make its appearance is not always the same, and we must therefore watch for the development of any of the symptoms of glanders. A leg, usually the hind leg, may suddenly become swollen, and this swelling is usually followed by the appearance of what are termed farcy buds or buttons.

The farcy bud is a lump varying in size from a bullet to a walnut. They are first felt or seen beneath the skin, which structure they will involve, causing the death of the part immediately over the bud. There is then formed an ulcer with a dirty

gray appearing bottom, surrounded by ragged overhanging edges of skin. From this ulcer there is a discharge, the important feature of which is a consistency such as the white of an egg possesses, combined with a color simulating olive oil. It is very tenacious, and adheres to the edges of the ulcer over which it gradually forms a scab, which becomes thicker and thicker until it drops off and is replaced by the same process. Some of the discharge drips downward and is found adhering tightly to the hair. The ulcers may leave a permanent scar.

The presence of a discharge from the nostrils should always be regarded with suspicion, and lead to a careful examination. The character of the discharge is similar to that from the farcy bud, and is characteristic in its adherence to the wings of the nostril. The lining membranes of the nostrils frequently show small nodules which break down with the formation of deep ulcers, the bottoms of which have the same general appearance as the ulcer of farcy. When close together these ulcers may coalesce and gnaw their way entirely through the septum between the nostrils. If ulcers heal there remains almost indefinitely a typical whitish scar, star shaped, with rays extending in various directons from its centre.

The swelling of the submaxillary lymphatic glands which are located high between the branches of the lower jaw and under the base of the tongue is also of great importance. In glanders these glands are not sensitive, but are hard and indurated, like a bunch of hard grapes, while in the swelling of the same glands in such diseases as influenza or distemper they are sensitive, have a more doughy consistency and tend to break down with pus formation.

Lymph vessels lying close beneath the skin may become indurated and appear as hard cords. Animals affected with these symptoms of glanders usually have slatish gray nodules of the disease scattered throughout the substance of the lungs, and from these there is produced the symptom of coughing, which rather closely resembles the coughing of a horse affected with heaves.

The humane officer, and frequently the veterinarian, is unable

to determine the presence of glanders in those horses where the disease is occult, or latent, and where there is no external evidence of its spreading. The detection of such cases is of great importance in the suppression of epizootics of the disease.

In the control and suppression of outbreaks ultimate eradication should be the aim. To carry out this work we need certain fundamental legislation such as laws which compel the veterinarian or any other person whatever to report promptly to a designated authority the presence of every single case of glanders or suspected case.

After the establishment of the diagnosis of glanders, authority should exist for the slaughter of every diseased animal, either with or without reimbursement to the owner, and all infected premises should be submitted to a thorough disinfection, subject to official supervision. A provisional quarantine should be established by which the identity of all animals exposed to the infection, or as we usually term them "contact horses," might be maintained so that such animals could be kept under surveillance. We should act upon the supposition that every clinical case of glanders may prove to be a centre by which the remaining horses in the stable would become affected with the disease, or as a centre from which it might spread indefinitely by the contamination of public water troughs.

As a result of the latest scientific investigations it is important that all contact horses be submitted to a special test for the diagnosis of possible latent cases. The complement fixation method for the diagnosis of glanders was discovered in 1909, and the eradication of glanders from that country, and of the United States Bureau of Animal Industry in official work. Its accuracy is considered to be more than 97 per cent., and when combined with what is known as the aggultination test it is practically 100 per cent. perfect in its positive diagnosis.

The use of this method requires that a small quantity of blood be removed from the horse by means of a trocar and canula, and submitted to a laboratory for examination which requires about 24 hours to complete. Horse owners more readily submit

their stock to this test than to the mallein test, which is less accurate and requires the stabling of the horses for at least 24 hours.

In some cities and countries horses which react to any of the various tests, but show no clinical evidence of glanders, are permitted upon the streets, but it has been the experience of Dr. J. G. Rutherford, formerly Veterinary-Director General of Canada, under whose direction very extensive work has been conducted in the eradication of glanders from that country, and of the United States Bureau of Animal Industry in stamping out an outbreak of the disease in Washington, D. C., that it is a dangerous plan not to destroy these reacting horses. It is therefore recommended that the policy of destroying all known cases of glanders be established.

The matter of disinfection is of great importance when we consider, as mentioned early in this paper, the methods by which the disease may be transmitted. The infected stable should first be thoroughly cleaned and then saturated with a reliable disinfectant. All of the harness which has come in contact with diseased animals should be soaked in the disinfectant, as well as curry combs and brushes. These latter in the hands of stable men are especially dangerous, as they are used promiscously upon different horses in the stables, and should there be any abrasions of the skin the glanders bacilli upon the curry comb or brush would readily make a direct inoculation.

Precautions as outlined would probably be sufficient to stamp out an epizootic in the country section, and in the cities also if it were not for the many public sources of infection, among which I will draw special attention to the public drinking fountain.

When a glandered horse with a nasal discharge drinks from a public drinking fountain, not infrequently some of the discharge is deposited in the water, or the animal may rub its nose against the edges of the trough, smearing the infected discharge thereon. As healthy horses drink from this contaminated source they are liable to become infected. Glandered and healthy horses drinking at the same time at the trough may come in direct contact by rubbing their noses together.

An English investigator demonstrated by laboratory experiments that the bacilli of glanders may live unharmed in ordinary London water for 26 days in the month of August. This is a period of the year when horses draw largely upon public drinking troughs for their supply of water, and clearly demonstrates the danger from this source in the spreading of glanders.

The veterinary sanitarian is in perfect harmony with the humane societies of the country in their efforts to supply drinking water to horses working upon the streets, but as the public fountains may be such a prominent cause of the dissemination of glanders the sanitarians desire the co-operation of the societies in in the establishment of such means of watering horses as may fulfil the requirements of humanity, and protect the horses from contracting disease.

Two methods for the public watering of horses may be satisfactory. First, the installation of hydrants at frequent intervals along the streets, the drivers of horses carrying with them individual water buckets. This measure, which is efficient under any conditions, has been found necessary in controlling outbreaks of glanders. In various cities the suppression of the disease has not been accomplished while the general public water troughs were maintained. The other method is the installation of fountains made of non-porous, durable material, which are specially constructed to suppy constantly fresh water and carry off any contaminated substances. As a type for such trough it is recommended that it be so formed that the noses of horses cannot come in contact while drinking. The entrance of the water should be from the bottom of the trough in such manner that a constant rotary current will be produced. As the water reaches the surface it should flow over the rim of the trough throughout its entire circumference, being caught beneath in a basin which is covered to prevent it from being accessible to dogs and cats.

As some heavy material may be deposited in the water and sink to the bottom of the trough rather than pass with the current over its edges, an exit pipe from the lowest point of the base of the trough should be provided to carry away this sediment.

No public trough should be permitted to exist which is not equipped with a constant flow of water, and in which the exit pipes are not of ample diameter to carry away material which may be deposited in the water. Troughs should be subject to frequent and thorough cleansing and disinfection.

The trough equipped with a float which permits the entrance of water only as the amount in the trough is lowered by drinking should not be tolerated.

To-day the general public is becoming awakened to the manifold dangers lurking in the public drinking cup for humans, and a number of States and cities have prohibited by law the maintenance of public cups by transportation companies and in office buildings.

To keep abreast with the modern progress of sanitation and preventive medicine, and to protect the horses who must drink wherever water may be presented, we should work for the abolition of the public drinking fountain, or for its regulation, permitting only the establishment of such fountains as are constructed upon sanitary principles.

ILLUSTRATED LECTURES ON THE CARE AND TREATMENT OF WILD ANIMALS.—Prof. W. Reid Blair, of the New York State Veterinary College at New York University in New York City, and Veterinarian and Pathologist to the New York Zoological Park, gave a course of illustrated lectures on the care and treatment of wild animals in captivity to the students at the Ontario Veterinary College, Toronto, Canada, the third week in November. Our esteemed friend, Prof. E. A. A. Grange, principal of the school, presided, and the lectures were largely attended by members of the profession, students and laymen. During the course of his lectures Prof. Blair corrected the impression that tuberculosis is rampant in wild animals in confinement, and left the impression with his hearers that rachitis and osteomalacia were common and that parasitic diseases were the cause of considerable mortality.

AT the recent meeting of the Tennessee Veterinary Medical Association held in Memphis Dr. Tait Butler and Mr. Harry C. Moore were elected to honorary membership.

CANNABIS.*

By Herbert F. Palmer, Philadelphia, Pa.

Cannabis Indica or Indian Hemp is the name under which all of our cannabis of former days was marketed. Cannabis Indica is obtained from the plant cannabis sativa, a native of Caucasus; Persia, and the hilly regions of Northern India. It is an annual plant, from four to eight or more feet in height, with an erect branching angular stem.

The U. S. Dispensatory says: "The hemp plant of India, from which the drug was formerly derived, has been considered by some as a distinct species and named Cannabis Indica, but the most observing botanists, upon comparing it with our cultivated plant, have been unable to discover any specific difference. It is now considered a variety and is distinguished by epithet, 'Indica.'"

It was Mr. H. C. Wood who first used the American plant by taking a parcel of plant from Kentucky, making an alcoholic extract, and found it effective in less than 1 gr. This result was so decisive that at the 1880 Revision of our Pharmacopeia, the American plant was recognized, but in 1890, it was dropped as C. Americana.

Remington in his *Practice of Pharmacy,* says: "The dried flowering tops of the pistillate plants of Cannabis sativa (Linne) grown in the East Indies and gathered while the fruits are yet undeveloped and carrying the whole of their natural resin." In the native Indian fields, the male plant is removed from the field long before the female plants are gathered, as they considered the unfertilized female plant would produce a greater quantity of resin than if both were allowed to grow together. In America

* Paper read at fiftieth anniversary meeting, American Veterinary Medical Association, New York, September, 1913.

no particular attention is paid to this fact. Such Indian cannabis contains a resinous substance—cannabinine, volatile oil and tetano cannabinine. Alcohol is the best solvent for the active principles.

According to Winslow in his *Materia Medica,* the active principle of Cannabis Indica is Cannabinol, a red oil or resin boiling at a high temperature. The therapeutic value of the principle has not been sufficiently studied to enable it to be used as a substitute for the crude drug or its preparations.

The fluid extract and a tincture are official. According to Caspari, much of the commercial drug is of poor quality, and it seems desirable to have the fluid extract tested physiologically before it is used.

There are three varieties of Cannabis now used by the veterinarian—the Indica, the African and the American. Each is given the same chemical and physiological assay, and as far as can be determined, they are identical in strength. Isolated patches of the American variety are found in the outskirts of Philadelphia, and some of the commercial article has been grown. Both of these patches gave a plant from which a fluid extract of Cannabis Americana was made, which tested high in physiological activity. This nearby supply of the hemp plant enables the great reduction in price of the American over the Persian product.

Charas or Churrus, or Hashish, as the Arabs call it, is a resinous substance obtained from the yellow glands of the plant. It is secured either by rubbing the flowering tops of the plants in the hands and scraping the resin from the hand or by men clothed in rawhides running through the dwarf plants, securing enough of the resin on the rawhide clothes to collect into a ball, which they call charas. This crude material was formerly employed as an intoxicating agent, but is now excluded from civilized medicine.

Cannabis is assayed both chemically and physiologically. In the physiological assay, 0.2 gram of fluid extract of Cannabis per kilo of weight of dog must produce first, excitability; second, muscular inco-ordination, followed by lassitude and sleep. The results are shown for several hours.

It has been clearly shown in the laboratory that the physiolo-

gical assay does not always follow the results of the chemical assay. For instance, the chemical assay will determine the amount of the resin, but the physiological effect does not always follow the percentage of resin.

The following table shows the comparative results of both physiological and chemical assay of the three varieties of Cannabis:

Cannabis Indica.		Cannabis Africana.		Cannabis Americana.	
Chemical Assay. % Resin.	Physiological Assay. %	Chemical Assay. % Resin.	Physiological Assay. %	Chemical Assay. % Resin.	Physiological Assay. %
12.2	....	.....	....	.....	....
12.7	....	10.6	100	6.4	133
14.25	100	16.77	133.33	12.46	100
12.81	100	14.2	133.3	14.09	100
13.04	80	8.6	100	.....	....
13.4	66	10.0	133	.....	....
.....	....	17.5	Less than 20	.....	....
.....	....	18.79	100	.....	....
.....	....	17.78	83	.....	....
14	160	10.71	133	12.94	133
10.38	133	.....	....	5.29	100
.....	....	.....	....	6.55	100
.....	....	.....	....	10.78	160
15.07	133	.....	....	.....	250
.....	200	.....	....	.....	114
.....	140	.....	....	17.06	114

From the observations made on dogs, it was shown that Cannabis Africana exerts a more hypnotic effect than Cannabis Indica. This conclusion was also borne out with its use on horses at the University of Pennsylvania. We feel positive also that it will be shown that Cannabis Americana will be found to possess less deliriant and more of the hypnotic effect than the Cannabis Indica.

According to Winslow in his *Materia Medica,* Indian hemp is a distinct depressant to the functions of the brain and cord in poisonous doses, although small quantities thereapeutically stimulate these organs. It produces in man a kind of intoxication and mild delirium. It is not comparable to morphine as an analgesic on account of the uncertainty and slowness of its action and because anesthesia is only produced by an unwarrantably large dose. It is only superior to opium in not causing constipation, anorexia or indigestion.

For this latter reason, veterinarians have often employed cannabis, and profitably so, for the relief of colics of the horse. Many make it the chief anodyne of their colic mixtures. In all such cases it has been used per orum and very satisfactory results thus obtained.

Such use of the drug is to be commended. There has however come a tendency to use this drug in the vein. This has no doubt arisen from the fact that quick action is desired and also from the fact of its being used on " Subs " and no immediate bad results noticed. Dr. E. L. Quitman, at a recent clinic of the Missouri Valley Veterinary Association, said in substance, the active principle of cannabis indica depends on a resin, and when resin and water are mixed, a gummy precipitate results. This is exactly the same when cannabis and blood are mixed. This resin introduced into the blood stream may not at once form a thrombus and you will likely produce complete anesthesia. You may however have a case of obscure lameness in the same horse, to which you gave the cannabis in the vein, and it may be days or even months afterward. The cannabis may have formed a thrombus and even at this late date given trouble.

To ascertain what effect the alcohol contained in the fluid extract would have, a series of test dogs was used. The regulation dose of 2 gram per kilo of body weight was given of alcohol per orum, and no appreciable results noticed. However, if an alcoholic equivalent of .2 gram per kilo of body weight was given in the vein, the result was very similar to the fluid extract of cannabis. Excitability, inco-ordination and lassitude followed the alcoholic dose in about the same way and lasted about as long as the standard dose of fld. ext. cannabis when given in the vein.

These results were rather startling, so similar work was tried upon a horse, but with far different results. A dose of alcohol equivalent to two and three times that contained in cannabis was given in the vein. Only slight reactions were noticed and nothing like the excitability, inco-ordination and lassitude was obtained as with cannabis.

However, the proportionate dose of cannabis for the horse is

far less than for the dog. In the vein of the horse action is obtained in doses of about .02 grams per kilo of body weight and great variation is also noted upon the individual animal.

These results show us that the full action of cannabis was not due to its alcoholic content.

It also showed the amount of cannabis necessary to produce physiological effect in a horse was much less in proportion to weight than in a dog.

PRESIDENT CHASE'S LETTER.—In forwarding the minutes of Secretary Pro Tem. J. Payne Lowe, of the alumni association of the New York-American Veterinary College, President Chase, of that organization, sent the following letter of transmittal, which is so full of enthusiasm and seems such a direct message to his fellow alumnae that we have thought best to reproduce it.

BAY SHORE, N. Y., OCT. 24, 1913.

Dr. R. W. Ellis, Dear Doctor:

Enclosed herewith please find minutes of alumni meeting held at Hotel Astor.

It is the aim of the present officers of the alumni association to make our association a stronger and more powerful organization for good, and now that our college has received State recognition should be an impetus to all the old graduates to do what they can to help place her upon a firm foundation as the leading veterinary college of America.

It is earnestly requested that all graduates who have not as yet affiliated themselves with the alumni association send their names at once to the secretary, Dr. P. K. Nichols, Port Richmond, S. I., N. Y.

Do not let the spirit of fraternity lag in our association, but help keep fresh the pleasant memories of our college days, and by our moral support aid the faculty and encourage the undergraduates.

Fraternally yours,

CHAS. S. CHASE, D.V.S.,
President Alumni Association.

APPRECIATED UP IN SASKATCHEWAN.—A subscriber away up in Saskatchewan writes in renewing: "I have much pleasure in saying it is really a veterinary library in itself; and I don't want to miss a *single* number of the REVIEW.

THE ABSOLUTE RELIABILITY OF DOUBLE ANTHRAX VACCINE IN CONTROLLING WELL-ESTABLISHED OUTBREAKS OF ANTHRAX.

By Dr. Wm. W. Yard, State Veterinarian; Secretary State Veterinary Exam. Board; Chief State Meat Inspection, Denver, Colorado.

During the month of September, 1910, there was reported to me by the local U. S. Veterinarian in the southern part of the State of Colorado, a serious outbreak of anthrax in some pedigreed steers.

An investigation was immediately started, and cattle and horses were found to be dying here and there for about eleven miles of territory. The usual quarantines were established, animals dead were all burned. This is one of the most important measures to be taken first.

The balance of the well cattle were put upon non-infected pastures and immediately vaccinated with the double Pasteur vaccine, the vaccinations being ten days apart.

Where animals are at the time of the vaccination infected, they will die quickly, so that there is always a chance of a few dying from the so-called vaccination; but in this outbreak there was not another head of cattle died; and although this section of country had been horribly exposed to the infection, there has not been reported any more cases of anthrax from that section to date.

During July of this year anthrax was reported twenty-five miles west and north of the 1910 section. Upon investigation it was found that horses, cattle and hogs were dying of the disease over an area of some fifteen miles. Some one or two local veterinarians had been called in and were, and had been, vaccinating with a single vaccine and the stock was still dying,

so I as state sanitary officer persuaded the veterinarians and the owners to revaccinate, which was done as soon as 2,000 doses of doubles could be obtained, and they ceased dying at once.

This same method was used over another section in which several animals died on the streets of a large town. Just as soon as they could be vaccinated with the double vaccine they stopped dying, and the reported loss from the vaccination is practically nothing. There is now another outbreak which has jumped twenty miles, and they are vaccinating as rapidly as is possible.

It is a simple procedure in competent hands in stock on the farm; but I have found a number of cases on the open range, and although the owners of the cattle are well known and are more than willing to do all in their power to co-operate in controlling the spread, it is a matter requiring serious and very intelligent thought to advise how to control the range for the present as well as the future, as the exposed stock roam over an area of some 200 miles south principally. But I can assure any state veterinarian that the double vaccine, in my hands at least, has proven its never-failing control of anthrax, and we have had several serious outbreaks of this disease which promised of rapid spread when we took hold of it.

NEW YORK STATE VETERINARY COLLEGE, at Cornell University, Ithaca, N. Y., celebrated the formal opening of the new hospital and clinical buildings for large and small animals on November 15th last. The exercises were opened at 8 p. m. by President Schurman, followed by addresses from Director V. A. Moore, Dr. D. H. Udall, Dean David S. White, of the College of Veterinary Medicine, Ohio State University; Dean Louis A. Klein, of the School of Veterinary Medicine, University of Pennsylvania; Prof. James Law, first Director of the New York State College; and others. The exercises were followed by an inspection of the new buildings.

DR. DELL'S SAD AFFLICTION.—Through the *Los Angeles Times* of October 25, we learn of the death of Mrs. Hazel Dell Boller, at Alma Center, Wis., daughter of Dr. J. A. Dell, of Los Angeles, California. In tendering its sincere sympathy to Dr. Dell, the REVIEW voices the sentiment of the whole profession.

REPORTS OF CASES.

AN UNUSUAL CASE OF CONSTIPATION IN AN AGED HORSE.*

By Chester L. Blakely, M.D.V., Augusta, Me.

On February 2d I was called to see an eighteen-year-old horse, weighing 1,100 pounds, a driver, that had laid down after breakfast as if in pain. The horse showed no signs of pain after my arrival, and my diagnosis was tardy action of bowels, due to too *little* exercise and too *much* feed.

I gave one of Abbott's purgative tablets and left a mixture of nux-digitalis and belladonna to be given every three hours on tongue; and gave hot water rectal injection. Next morning the report was no action from bowels and no appetite or signs of pain. I gave another purgative tablet and orders to repeat tablet every six hours, with hot water injection every three hours.

The next morning the same report. No action, no pain, no appetite. On giving rectal injection a few large masses of chewed shavings and fæecs were expelled, and I removed several with my hands. From this time (Tuesday until Saturday) the bowels did not move, in spite of the administration of three pounds of epsom salts in one pound doses, and three quarts pure raw oil in 1 quart doses six hours apart, with hot water injections, diuretics and daily exercise. On Saturday I gave 60 grains borium chloride (6-10 grain tabs.) intravenously, purgative (Abbott Alkaloidal Co.'s) with ½ ounce of chloral hydrate in one pint of hot water; and during the afternoon bowels moved quite freely.

From Saturday, February 8th, after this thorough cleaning of bowels, I gave daily exercise, tonic of nux-digitalis and belladonna and diuretics. Appetite fair; bran mashes and very small amount of hay and some form of physic, either salts, oil or purgative tablet, every night until February 19th, when I called Dr. Joly in consultation.

The owner was absent in California and when notified that horse was sick and had been for 2 weeks, he wired for the hostler get me to have a well known non-graduate in consultation and to wire him our decision. Feeling that I was doing my best, I de-

* Read before the October meeting of the Maine Veterinary Medical Association at Waterville.

cided to have a consultation with a man of my own selection and take chances of incurring owner's displeasure, so I called Dr. Joly, and he prescribed 1 gr. strych. sulp. hypodermically three times daily, with one pint pure raw oil and one ounce of turpentine each night and morning for three doses.

I wired the owner that I had had Dr. Joly in consultation and that it was his opinion that horse would recover.

From the 19th to the 21st there was no action, making a period of thirteen days (8th to 21st) that bowes had not moved.

I now grew desperate and gave 90 grains of barium chloride —½ ounce chloral hydrate—in one pint of hot water, and still the bowels refused to move. No pain, normal pulse, normal temperature, no appetite.

The next day, Saturday, I gave 90 grains of barium chloride with chlora and hot water, and in two hours the coachman's wife thought she detected a peculiar odor; and on investigating found the horses bowels had moved three or four times, the discharges being quite hard.

From 2 to 3 p. m., the coachman counted fifteen distinct movements of the horses bowels; and during the six hours after administration of borium he was sure five bushel baskets of fæcal matter were discharged. Sunday morning the horse looked as though he had been drawn through a knot hole; but was hungry, had normal pulse and normal temperature. From now on I gave tonic of ammon. carbonate gentian, nux vom and spts. nitre in watery solution every eight hours; daily exercise and hot mashes and small ration of hay, and the animal gradually regained use of his bowels, and on March 1st I ceased calling on him.

This horse was bedded on pine shavings, and not having much to do had got into the habit of nibbling at the shavings.

The peculiar part of this case is the length of time that there was no action whatever (13 days), the freedom from pain, the lack of disturbance of temperture and pulse.

Trusting that this will ildustrate the possibility of recovery even after a two weeks loss of action of bowels, I submit this case for your kind consideration.

NOTE—This case of Dr. Blakely's is interesting, not alone to the younger practitioners because being out of the common it enlightens them, and prepares them to more successfully cope with the same conditions when they meet them in their own practices, but is also interesting to the older practitioners, who by reflection call to mind that the cases of that kind that they have met, have also usually been in aged horses. Which suggests that age is a predisposing factor in this troublesome condition. The writer recalls several during twenty-five years of general practice, where the subjects have been aged horses; amongst which, is a case with many features in common with Dr. Blakely's case, reported on page 49, volume xxi, number 1 (April, 1897, of the AMERICAN VETERINARY REVIEW, entitled *"An Obstinate Case of Impaction of the Small Intestines."*—[EDITOR.]

KNOT IN INTESTINE IN MARE.

By H. M. HAMILTON, V.M.D., Paris, Texas.

"Careful observation makes a skillful practitioner, but his skill dies with him. By recording his observations, he adds to the knowledge of his profession, and assists by his facts in building up the solid edifice of pathological science."

Subject—Black mare, aged, weight 1,000 pounds, with colt six weeks old.

Symptoms—Was called early July 24th to see mare, owner says he found the mare sick upon arising. She showed very severe colicky pains. Would squat with abdomen close to ground when led; being loose in lot she would fall or lie down very suddenly and immediately roll upon her back, which position she was prone to keep. She would get up and run possibly 100 feet and fall again. Pulse, 54. Temp. normal. Membranes somewhat congested. Peristaltic action, none. Little flatulence.

The mare was given 1 gr. arecoline, ½ gr. strychnine—with no effect. Repeated arecoline ½ gr. in one-half hour—no effect. Gave her 2 drams cannabis indica intervenously, and she lay down on her side and slept for possibly four or five hours, then I was called again. Mare was very uneasy as before. Pulse, 66, but strong. Temp. 100.5 F. Membranes congested. Repeated the arecoline and strychnine as in the morning, with rectal injection of cold water. This was followed by the passage of little flatus, and slight peristaltic action on right side. Rectal examination negative. Tried to administer drench, but animal would not swallow and received some down trachea, which ran out when head was lowered. Left animal about 5 p. m., lying upon breast very quiet. Told owner she would die and that I thought she had some displacement of the bowel. Called next morning, owner said mare dropped dead about 7 a. m.

Post mortem—Abdominal cavity, on opening, revealed a quantity of dark bloody fluid. Considerable peritonitis, and the last loop of the small intestine, just before it enters the caecum, was tied in one complete knot, completely obstructing the bowel, about three feet being involved.

PYAEMIC ARTHRITIS.

By H. M. HAMILTON, V.M.D., Paris, Texas.

Subject—Four-weeks-old female, grade draft colt.

History—Swelling appeared in left hock. Colt showing some lameness. The swelling extending to right hock.

Symptoms—Upon examining the colt on June 22, found swelling in both hocks, small swelling on left side over fourth rib in middle of the lower third. Colt seemed to be unable to control movements of hind quarters. Colt very strong, appetite good. Temp. 103 F. Pulse accellerated but good. Next day colt about the same except unable to rise when down, but when helped could get up and stand unsteady. On June 25 symptoms all somewhat more marked, could not stand alone; appetite still good. Some trouble voiding urine. Catheterized colt, found some sediment in urine of purulent nature. On June 29 colt very weak, head and legs skinned where it had struggled around in stall. Unable to get it on its feet. Advised owner to destroy same as I thought there was no chance for recovery.

Treatment—Mixed bacterial vaccines, June 22-25. Cold application to swellings and echinacea 2 drams three times daily.

Post mortem—Colt was destroyed and autopsy held June 29. Abdominal cavity being opened revealed the urachus and umbilical veins very much distended. Incising same found urachus filled with thick cheesy pus up to the bladder. The umbilical vein also distended up to the liver, the two containing about one quart of pus. Other organs normal. *Thoracic cavity:* There was adhesion of plura and lungs to the region of the swelling on outside, the fourth rib being fractured at this point. Also found an abscess in roof of plural cavity just below fourth and fifth dorsal vertebrae. Upon opening the abscess and following up the cavity found it entering the neural canal, involving the spinal cord.

This case was one of great interest to me as it is the only one I ever saw revealing paralysis.

ABLATION OF RIGHT MAMMAE.

By PHILIP V. WEAVER, D.V.M., Glen Cove, N. Y.

The enclosed cut shows the ablation of the mammae of the right side. This was the first case of gangrene of the udder occuring in my practice, and showed a typical line of demarcation. Cow down, out flat, pulse 70, temperature 103 and complete prostration. Upon explaining that the only chance of saving the cow's life was by the ablation of the affected mammae, the owner wished me to proceed; saying the cow was registered, a prize winner, was in calf and was worth saving if only for breeding purposes.

There was very little resistance to the operation. I gave, however, an ounce and a half of chloral and proceeded; cutting outside the line of demarcation and ligated each vessel, as I came

to it, so as not to have too bloody a field to work in. Thus bisecting the udder and removing the right half. This, the gangrenous portion, was enormously enlarged and left quite a large wound, which is now healing without complications.

ANTEMORTEM DIAGNOSIS OF A GUT-TIE.

By Dr. R. A. Greenwood, Painesville, Ohio.

"Careful observation makes a skillful practitioner, but his skill dies with him. By recording his observations, he adds to the knowledge of his profession, and assists by his facts in building up the solid edifice of pathological science."

A farm horse weighing about 1,400 pounds was taken sick in harness about half an hour after the noon meal. I was called immediately and arrived in about two hours, and found all the symptoms of gastric indigestion; but upon rectal examinations (the importance of which is further emphasized here), found about three feet from the anus a constriction of the colon which would barely admit two fingers. Injections beyond the constricted portion produced painful paroxysms.

The foreman informed the owner that the horse could not live and was shot.

Postmortem showed ball of feces tied in a hard knot, the size of two fists. No attempt at an explanation as to how this could occur was made.

ABSTRACTS FROM EXCHANGES.

ENGLISH REVIEW.

By Prof. A. Liautard, M.D., V.M.

Chronic Nasal Discharge—[*Major E. E. Martin, F.R.C.V.S., D.V.H., A.V.C.*].—Artillery horse is laid up with apparently ordinary case of catarrh with lateral nasal discharge. There is a very strong odor from the nose. This has been observed since some time before. Some few days later, the discharge stopped but the smell persists, it is even more offensive. The animal is galloped and the discharge is absent. It returned after exercise and always with the same odor. There is no enlargement of the maxillary gland. The teeth are in good condition and nothing wrong with any of them. Malleine gives no results. Facial sinuses are explored but no explanation of the smell or of the odor can be found, even with repeated flushing. The animal was kept for some time and finally destroyed.

At the postmortem all the abdominal organs were found healthy. In the lungs there was in the anterior lobe of the right lung an abscess containing yellow creamy stinking pus. It escaped into the trachea through the bronchioles and communicated directly that way with the trachea. The horse had had strangles before and after recovery, was only laid up once without diagnosis declared, perhaps pneumonia. Either may have been the starting cause of the pulmonary abcess.—(*Vet. Record.*)

Spams of the Larynx [*Herbert E. Whitemore*].—This occured in two cases under the same condition of work, in hay field and in hot weather. Immediate relief was obtained by tracheotomy.

The first case was in a mare which was taken with difficult breathing. Her respiration was loud and her membranes cyanosed. Morphine injections and liniment externally giving no relief, and the condition assuming a bad aspect, the trachea was hastily opened and a tube introduced, followed by normal breathing in a few minutes.

The second case took place in a powerful cart horse. The animal showed similar difficulty in breathing, but more marked. The horse was standing, however, and when, to perform the operation, the head was raised he fell down and was operated in that position. As no tube was on hand, a piece of lead tubing was used instead. In both cases the tubes were left in place for a day or two for precaution.—(*Vet. Record.*)

CHLOROFORM STANDING [*J. H. Parker, M.R.C.V.S.*].—Three cases are records. One in a heavy Shire stallion, ugly in shoeing when standing. Three ounces brought him down, he never gave trouble after. A second Shire gelding to be operated for poll-evil and fistulous withers. No trouble.

A third, as soon as he had the chloroform muzzle on, started off full gallop, ran all over a field, was finally secured, cast with hobbles, and then chloroformed when down. He was unnerved on the off fore leg for navicular disease. After the operation he ate a mouthful or two and then began to blow and retch, bringing up mucous. He kept this for an hour or so and got over it.—(*Ibiden.*)

PREVENTION OF MILK FEVER [*James Smith, M.R.C.V.S.*].—As addition to a discussion of the subject, the author writes: My experience teaches me that neither the removal of the calf from the cow as soon as it is born, nor the leaving it with the cow, either causes or prevents the disease. Neither does refraining from milking the cow immediately after calving have that effect.

By the following rules, strictly carried out, the cow will not go down with milk fever. Suspicious cow, that every practitioner will recognize, is to be taken up and stabled a fortnight before due to calve, she is fed sparingly or exercised an hour daily. A few days before her time is up, she should get a mild aperient drench. At the time of calving her stomach should be fairly empty. After calving another aperient drench and fed on gruel and have treacle to drink. Enough milk may be taken at once to supply the calf, but the udder *must not* be stripped until after the third or fourth day, when gradually she is brought back to her rations and milked out. In very rare cases milk is allowed to be taken before calving, if the udder is abnormally distended.

These suggestions may appear as old fashioned, but try them, they are none the worse.—(*Vet. Record.*)

FRACTURE OF THE CUNEIFORM [*H. G. Tabuteau Herrick, M.R.C.V.S.*].—A five-year-old mare being led back to her stable and going up on an inclining plank to reach it, slipped and fell. Being unable to get up by herself, she was raised with temporary slings and it was found that she was unable to bear any weight on the off hind leg. This assumed an abnormal position, appearing longer than its mate. The point of the toe rested on the ground, whilst there was excessive flexion of the hock and fetlock. Looking at the injured hock it had the appearance of a very prominent curb. There was crepitation and increased mobility in the hock joint, peculiary marked in movements of abduction and adduction of the metatarsus, yet the pain was not marked. The mare was shot the next day. On examination of the hock joint, a fracture of the cuneiform magnum in two equal pieces was found.—(*Vet. Record.*)

HODGKIN'S DISEASE IN A DOG [*Wilfred Walters, M.R.C.V.S.*].—An aged Scotch terrier was said by his owner to have goitre. He had about fifteen tumours under the throat in the region of the larynx, varying in size, quite painless and seeming to cause no inconvenience. The temperature was normal, appetite good and a slight cough was present. Tonsils were much inflamed. No positive diagnosis made and perhaps some bacterial infection suspected. After four days, two more swellings came on the point of the shoulder. As others made their appearance beneath the tongue and near the penis and as the dog did not improve by the iodine treatment to which he was submitted, he was killed. Some of the tumours examined were pronounced enenlarged lymphatic glands and the case one of Hodgkin's disease. —(*Vet. News.*)

FRENCH REVIEW.

BY PROF. A. LIAUTARD, M.D., V.M.

FRACTURE OF THE CRANIUM IN A HORSE [*Major C. Lesbre, Army Veterinarian*].—This case adds another evidence of the diagnosis of such injuries when an hemorrhage from the ears or nose is observed on the injured animal.

An officers horse was being dressed for certain work by the application of very severe artificial means. At one of the exercises, the animal refused to submit to the apparatus, resisted and was stimulated by a touch of the whip on the nose, rears and falls

backwards. He rises, walks a few steps, rears a second time and dies immediately. An abundant hemorrhage took place from both ears and the nostrils. The diagnosis is made without hesitancy of fracture of the base of the cranium and confirmed by post mortem, which shows the guttural pouches and nasal cavities filled with clotted blood. The dura mater is separated from the bone and torn. The substance of the cerebellum and cerebrum is crushed, and with all these a comminuted fracture is exposed involving the roof and base of the cranium and forming three segements of the occipital, temporal, parietal and sphenoid bones.—(*Soc. des Sciences Veterin. de Lyon*).

606 IN INFECTIOUS PNEUMONIA [*Mr. C. Hebray*].—Gelding five years old, is placed in a stable where during the last twelve months six horses have died with pneumonic diseases. When he arrives to his new quarters, the horse is bled (5 litres, as is customary in that establishment). A few hours later he has chills, breathes with difficulty, the temperature rises to 40 degrees C. He is treated with mustard poultices, a second bleeding and antifebrile intravenous injections. No improvement takes place, and as signs of laminitis began to appear, he receives arecoline, and on the sixth day of the sickness the writer is called. The horse has laminitis of the fore feet, respiration is 70, a thick yellowish discharge from the nostrils, pulse small and thready, 80; dullness on the lower third of the chest, respiration absent, temperature 40. It is a case of pleuro-pneumonia complicated with laminitis. An inteavenous injection of 2 gramms of arseno-benzol Billon in 30 of physiological serum is given, cold poultices applied to the feet, sinapisms on the shoulders (?). An hour later, breathing is more difficult, temperature still 40- and 40-2. It keeps rising towards evening. From this moment the difference begins, the horse takes food, his pulse, respiration and temperature are improving. This condition is still better the next day, gradually the symptoms subside and after two days the horse is out of danger. There has been no relapse nor complication.—(*Rev. Gener. de Med. Veter.*)

SCLEROSIS WITH PARETO-ATAXIA TROUBLES IN A DOG [*Dr. L. Marchand and Prof. G. Petit*].—Six-year-old fox terrier has very imperfect history. He is sick since several months, and his ailments began by troubles in his locomotion. Without being paralyzed he does not walk any more in a straight line and seems to have certain hesitancy in his motions.

Now the principal symptoms consist in motor and sensitive troubles. For the first, they are in muscular co-ordination. They are more marked when the dog is standing or walking. Standing the hind legs are stretched and extended outwards. The anterior show pareto-ataxic troubles still more marked; the legs are carried outwards as if they gave away under the weight of the body. The back is arched; so much so at times that when the hind quarters stand its proper height with the legs in extension, the anteriors are flexed and the head rests on the ground. There is also a direction to the right of the fore on the hind parts. Equilibrium is unsteady and the dog falls with the slightest push. In walking the dog throws his legs outwards, in the direction he is moving; they are hesitating and the tendinous reflexes are weak. There is no amyotrophy. The troubles of sensibility consists in anesthesia and generalized analgesia. The animal is indifferent to even deep pricks and yet any movements of the body are extremely painful. Raising of the head provokes loud cries and brings about an erection. Olfactory, gustatory, occular sensibility seem normal.

Incurable, the dog was destroyed. No lesions were found any where except in the nervous centres, which by histological examination presented a medullary sclerosis with predominance of the lesions upon the posterior and lateral fasciculi of the spinal cord.—(*Rec. de Medec. Veterin.*)

Fracture of the Second Dorsal Vertebrae in a Horse [*Major E. Larieux and Lieut. Richon Army Veterinarians*].—While manoeuvering a mare is severly injured by a fall, is unable to get up, and presents the following symptoms. Lying on her left side, the fore legs are slightly flexed and moving now and then, the hind legs are in extension and motionless; the head and neck are raised only when the animal attempts to get up. Respiration is accelerated, pulse small; the hind quarters, the anus, the vulva are insensible to pricks. There is general loss of motion and sensibility from the middle of the back. There is paralysis of the bladder and rectum. Fracture of the vertebral column is present. The mare is kiled. At the post mortem, there was found a comminuted fracture of the body of the second dorsal vertebrae with crushing of the spinal cord. There was a dislocation upwards of the second rib of the right side.—(*Bullet. de a Soc. Centr.*)

Fracture of the Sternum and Ribs [*By the Same*].—The same accident, when the preceding case occurred, was also the

cause of another, which took place on another mare, sixteen years old. Thrown down also, she got up with difficulty but was incapable of putting weight on the right forefoot. She moved on three legs. The right fore seems hanging down at the point of the shoulder. A large swelling develops at that point and spreads rapidly. On examining the shoulder, the animal shows pain. The leg can be moved in abduction and adduction. There seems to be a displacement of the bones about the joint, even crepitation is detected, but only shortly after the accident. Fracture of the glenoid cavity is diagnosed and the mare killed. At the imperfect post mortem that was made there were found fracture of the anterior part of the strenum on a level with the second and third sternebrae, lacerations of muscles, fracture of the second, third and fourth ribs at their sternal articulations.—(*Ibidem.*)

Tuberculous Orchitis in a Horse [*Major Ch. Darmagnac Army Veterinarian*].—An eight-year-old stallion has swelling of the testicular region. The left testicle is twice its normal size, not painful, not abnormally warm, the gland is adherent to the vaginal serous membrane. Its tissue seems densified and in it a nodule is vaguely felt a little below the epididymis. Rectal examination reveals a spermatic cord hypertrophied in its inguinal portion, but normal above the superior inguinal ring. In general condition the animal is rather poor, but he has good appetite. Temperature is normal. Malleine is injected. Negative results. Tuberculine gives 103 of hyperthermy. Warm painful swelling at the point of injection, general reaction not important, the result is doubtful. Bacilli are found in the sperm, which took the colration of bacillus of Koch. Diagnosis of tuberculosis is made. The horse is castrated and recovers from the operation. Examination of the testicle shows some twenty tubercules in the tissue of the gland, some of which are in caseous condition. Their contents shows the bacilli in great number. The horse has done excellent work since and improved in general condition.—(*Bullet. de la Soc. Cent.*)

Treatment of Pleuresy by Injections of Air [*Major Dr. Bouchet, Army Veterinarian*].—In the presence of the results obtained in human medicine by this treatment the author has thought to demonstrate the innocuity of the introduction of air in the thoracic cavity and principally the possibility of preventing adhesions between the walls of the pleural cavity, adhesions which often render animals that had been affected with pleurisy

unfit for some work. The author records several cases successfully treated by him and in one principally, gives his *modus operandi.*

A mare had pleuresy with effusion; with an apparatus of Potain, 200 gramms of liquid are extracted and 200 c.c. of atmospheric air are introduced. Then repetition of the same process is made with 5 litres of liquid extracted. Croton oil in ether is rubbed on each side of the chest. Three days after, repetition of the thoracenthesis, only 3 litres can be extracted. Improvement begins to show. Four days after the second operation, a third thoracenthesis removes only 850 gramms of liquid and one litre of air is injected. This was followed by a marked improvement, better appetite, lower temperature, easier breathing dullness almost entirely gone. A cardiac treatment of digitalis completed the recovery of the animal.—(*Ibidem.*)

Dr. Michael Forms New Veterinary Organization in Southern Illinois, as the result of his "Get Together" meeting, announced on page 246 of our November issue. Fourteen men eligible for membership were present, and were enthusiastic over the project. After quite an extended clinic, followed by a chicken dinner, an association was organized, and the following set of officers elected. President, Dr. W. Hoehner, Belleville; Vice-President, Dr. Lyle, Porta; Treasurer, Dr. McKinley, Freeburg; and Secretary, Dr. L. B. Michael, Collinville. A committee was appointed to draw up a constitution and by-laws; also one to formulate a code of ethics. The name of the organization will be forwarded to us for our next issue. The next meeting of the organization will be held at O'Fallen on December 20, 1913.

All Tennesseans, regardless of their station in life, are extremely sorry to learn that Dr. J. A. Kiernan, U. S. Veterinary Inspector in Charge of Tick Eradication in Tennessee, Alabama and Mississippi is to soon move his headquarters from Nashville, Tennessee, to Birmingham, Alabama. Ticks have been eradicated from 51 counties in Tennessee and the State released from quarantine, hence it became necessary for Dr. Kiernan and his field force to shift their base of operations further south. His work is greatly appreciated by the people among whom he worked. Dr. Kiernan enjoys the distinction of being the first man to demonstrate that it was possible to eradicate ticks from a whole State.

CORRESPONDENCE.

VETERINARIANS AND THE ALLIED HORSE INTERESTS.

SANTA CRUZ, CALIFORNIA.

Editors AMERICAN VETERINARY REVIEW, NEW YORK: Co-operation of the Allied Horse Interests with the farmers could readily double the number of colts in any neighborhood, and when the veterinarians come down off their high horse and realize their chief dependence upon the horse for a good practice, then will they organize the allied horse interests in the country with the dealers and agents selling vehicles and farm machinery, harness and the horseshoers with the veterinarians all dependent upon the horse. This co-operation can go to the bankers and get the money to buy all the draft stallions they want. Then let these veterinarians direct more scientific breeding and management to not only increase the number of colts, but mature them to good horses; see that only the best pure bred stallions are used that are sound and right, that the mares are rightly bred and get in foal, and that proper precaution against "navel ill" is taken to save the useless loss of colts. In all this the veterinarians are the logical leaders that can double the horse breeding in the county, state and nation, that will add more to the prosperity of all classes than all of the grain crops or all of the other stock, well worthy of the steel of the scientific veterinarian to lead in horse breeding as the Government will do nothing to help the farmers in the matter.

The price of good draft horses is so high, and market demands so urgent, we must furnish more good horses to do the work or trucks must be adopted. The automobiles and trucks help the horse but little. Will the veterinarians come to the rescue and help the farmers to raise more horses for better farm teams and more big geldings for the eager market demand?

The veterinarians should either organize an American Allied Horse Association or identify themselves with The National Association of Allied Horse Interests, Trust Building, Providence, R. I.

T. BUTTERWORTH.

JOIN THE AMERICAN VETERINARY MEDICAL ASSOCIATION.

CHICAGO, ILL., NOVEMBER 21, 1913.

Veterinarians of America:

I wish to call the attention of veterinarians not members of the American Veterinary Medical Association to the advantages the association offers and suggest a few of the many reasons why you should join it.

The American Veterinary Medical Association includes in its membership the leading veterinarians of the United States, Canada and the Philippines and the foremost veterinarians and scientists of Europe are among its honored members. A membership in the association will bring you in contact with these men and you can get the best they have to offer. You cannot afford to miss this for it will increase your interest in the profession and help you financially.

The American Veterinary Medical Association has just completed a half century of successful work and gives promise of a more successful future.

Plans are now being perfected for a reorganization of the association that will make it more efficient along all lines.

The American Veterinary Medical Association has taken the lead in attempting to secure legislation that will greatly increase the efficiency of the Army veterinary service and obtain proper recognition of the army veterinarians. This important and greatly needed legislation will soon be passed by Congress.

The American Veterinary Medical Association has been of great assistance in raising the standard of veterinary education and advancing the interests of the profession generally.

The fees are low and you will find the splendid annual reports which you will receive free filled with the latest and best information available along all lines in veterinary science and practice.

I particularly urge upon recent graduates and all others who want to keep right up to date to join the association. It will be of great help to you and you can be of much assistance to the association. Graduates of duly accredited veterinary colleges are eligible to membership. Provision is also made for older graduates in section 4 of the by-laws as follows:

A veterinarian, graduate of a veterinary college, which at the time of his graduation did not maintain educational standards in

conformity with the active membership requirements of this association, may, upon recommendation of the executive committee be elected to membership, provided he has been duly graduated not less than five years prior to the date of application, and further, that the college has now ceased to graduate veterinarians contrary to the standards now fixed by this association.

A list of resident secretaries was published in the November issue of the REVIEW on pages 275-6, and you should write your State secretary for application blanks. If you wish further information regarding the association write the secretary, who will give it prompt attention. Join now and attend the New Orleans meeting in December 1914.

N. S. MAYO,
Secretary.

4753 Ravenswood Ave.

ANSWERS TO QUESTIONS.

On page 262 of the November issue of the REVIEW, three questions are asked. We did not answer them in that issue, as we desired to give our readers the first opportunity, but as no one has answered them through this office we do not know what their answers may have been. We will not republish the questions, but number them, as they can be seen by referring back to the November number. Replying to number (1), it is our opinion that on recovering from the operation referred to, the animal would be rendered infertile, but would not be unsexed.

Replying to number (2), it is our opinion that the operation referred to would have no effect either upon the cow conceiving or carrying the fœtus to full term, and that she would be no more predisposed to parturient paresis than a cow with a normal udder.

In regard to number (3), we are inclined to believe that the lymphatic circulation is more susceptible to some forms of invading bacteria than the venous circulation (for example, glanders). This last question we should be glad to have discussed, but feel that there is not much room for discussion of the first two—[Editor.]

DR. GEO. R. WHITE, State Veterinarian of Tennessee, has selected Dr. M. W. Miller, Terre Haute Veterinary College, '13, to take charge of the State Anti Hog Cholera Serum Plant. Dr. Miller's address is 1502 Clinton street, Nashville, Tennessee.

OBITUARY.

GEORGE H. PETERS, M.D.V.

Dr. George H. Peters died at his home in Waltham, Massachusetts, on September 25, 1913, of pneumonia, at the age of 32 years, after an illness of four days. Dr. Peters was born in Waltham in February, 1881, and spent his entire life there. After finishing his high school education, actuated by a love for horses and other animals, which had been instilled in him by association with his father, who for years had trained and driven race horses, he fancied the profession of veterinarian, and entered the McKillip Veterinary College, Chicago; from which institution he graduated in 1906, and immediately engaged in general practice in his home town, continuing to do so up to the time of his sudden taking away. Dr. Peters was unmarried and is survived by a mother, three brothers and a sister. To add to the sad affliction of his family by his loss, his father died the following week, October 3, eight days after his son, in the opinion of the attending physicians, of a broken heart. Dr. Peters and his father will be sadly missed by their townsmen by whom they were much loved. This double bereavement of their family is particularly sad. The home life of both Dr. Peters and his father was very beautiful. Their characters were sunny, generous and charitable, and the mutual devotion betwen them and the members of their family ideal. The REVIEW, in expressing heartfelt sympathy for the sorrowing family, voices the sentiment of all the profession.

DR. ELMER CRAFT.

" Dr. Elmer Craft, the president-elect of the Utah Veterinary Medical Association, died at his home in American Forks, Utah, Friday, October 17, 1913, from congestion of the lungs, due to exposure while attending the annual meeting of the association October 4 at Salt Lake City. At this meeting Dr. Craft was elected president of the association. He leaves a wife and two

small children. His illness was of so short duration and his taking off so sudden that the news hardly seemed credible to his many friends.

"The association by his death lost a good leader and the profession an ardent supporter.

"This association joins with his many friends in extending heart-felt sympathy to the bereft family."

[NOTE]—The above letter telling of the sudden death of Dr. Craft was received from Secretary Coburn, of the Utah Veterinary Medical Association, almost on top of a previous one enclosing the report of the meeting at Salt Lake City, in which he reported Dr. Craft's election as its chief executive. We have reproduced the letter verbatim. [ED.]

JAMES LINDSEY ROBERTSON, M.D., V.S., D.V.S.

Just as we were closing our forms we learned of the death of Professor James L. Robertson, in his seventy-first year. Already a graduate in medicine and also in veterinary medicine from the New York College of Veterinary Surgeons, Dr. Robertson graduated from the American Veterinary College in 1876, and held the chair of Theory and Practice of Equine Medicine in that institution from that time until the consolidation of the two schools, which formed the New York-American Veterinary College in 1899, and in the consolidated school up to the time that his health failed a couple of years ago, when he was made Professor Emeritus, which honor he held at the time of his death. During his forty years as a teacher of veterinary medicine he was engaged in general practice and was the ideal practitioner, just as he was the ideal teacher. His thorough knowledge of his subject and his kindly nature won the hearts of all whose privilege it was to have been his students; and he was loved not only by all his students, scattered from one end of the universe to the other, but by every member of the profession whose privilege it was to know him. His practice was principally equine, and his fondness for his patients was beautiful to witness. With these few words of respect to the memory of this grand old man, whose life has been so full of inspiring examples to his fellowmen, we leave the privilege of the writing of an obituary to one who was closely associated with him during the years of his greatest activity and achievements, the senior editor, Professor Liautard, in our January issue.

SOCIETY MEETINGS.

ASSOCIATION OF STATE AND PROVINCIAL VETERINARY COLLEGES.

Annual meeting for 1913 was called to order at the Hotel Astor, New York City, September 2, by Secretary Lyman, he being the senior elective officer present.

The association proceeded to elect temporary officers as follows: Dr. F. S. Schoenleber, president; Dr. L. A. Klein, vice-president; Dr. R. P. Lyman, secretary.

The following veterinarians representing state colleges were present: Dr. Murphy, Iowa State College; Dr. Schoenleber, Kansas State Agricultural College; Dr. Gay, University of Pennsylvania; Dr. Moore, New York State Veterinary College; Dr. Grange, University of Toronto; Dr. Klein, University of Pennsylvania; Dr. Fish, New York State Veterinary College; Dr. Lyman, Michigan Agricultural College; Dr. W. H. Hoskins, University of Pennsylvania; Dr. Cary, Alabama Polytechnic Institute; Dr. Hutton, Michigan Agricultural College; Dr. White, Ohio State University; Dr. Udall, New York State Veterinary College; Dr. Burnett, New York State Veterinary College.

A motion by Dr. Klein was duly made and seconded to hold a meeting at the time of the United States Live Stock Sanitary Meeting in December. Carried.

Dr. Cary presented a report as chairman of the committee on constitution and by-laws. It was regularly moved to receive the report and act upon each section separately. Carried. The constitution was then adopted subject to changes that were made through motions regularly made, seconded and carried, and was adopted as a whole to read as follows:

Constitution and By-Laws of the State and Provincial Association of Veterinary Colleges of America.

Section I. The object of this association shall be to advance the interests of veterinary colleges in America, and strive for a reasonable degree of uniformity in matriculation, course of study,

faculty and other specific features that are required in the building of the good and growing veterinary college.

Sec. II. The officers of this association shall be a president, three vice-presidents and a secretary-treasurer.

Sec. III. The duties of the officers shall be such as are commonly delegated to them in all similar organizations.

Sec. IV. Every state, provincial or government veterinary college in America shall be entitled to two voting members to be designated by the college represented and as many associate members as shall comply with this constitution and by-laws.

Sec. V. All changes or amendments to the constitution shall be presented in writing at the annual meeting in advance of the one at which it is to be voted on and the secretary-treasurer shall notify each member of the proposed change or amendment before its adoption.

BY-LAWS.

Section I. Order of business:

(a) Roll call.
(b) President's annual address.
(c) Report of secretary-treasurer.
(d) Report of committees.
(e) Special or general program of papers and discussions.
(f) Election of new members.
(g) Unfinished business.
(h) New business.
(i) Miscellaneous business.
(j) Election of officers.
(k) Installation of new officers.

Sec. II. The executive committee shall consist of the officers and the duties of this committee shall be to report on all applicants for membership and all other official business not otherwise provided for.

Sec. III. The following committees of three members each shall be appointed annually by the president:

(a) Committee on veterinary college entrance requirements.
(b) Committee on curricula.
(c) Committee on faculties.
(d) Committee on methods of teaching.

Sec. IV. This association shall meet annually at such time and place as shall be determined by vote of its members, and in case of emergency the executive committee may call a special meeting for a specific purpose. Each member shall be notified

in writing not less than two weeks in advance of the time, giving place and specific purpose of the special meeting.

Sec. V. A majority of the active membership shall constitute a quorum.

Sec. VI. When the association may consider it necessary, dues may be levied not to exceed $5 annually.

Sec. VII. Changes or amendments to the by-laws shall be presented in writing at least one day in advance of the adoption of the same.

Sec. VIII. Any section of the by-laws may be temporarily suspended by a two-thirds vote.

Dr. D. S. White moved that a copy of the new constitution and by-laws be sent to each college eligible to membership.

Dr. White then read his report as chairman of the committee on entrance requirements. The report reads as follows:

Gentlemen—The standards now recommended by the Council of the American Medical Association prerequisite to the practice of medicine are:

A—Preliminary education must be "sufficient to enable the candidate to enter a recognized university and in addition a course of one or two years devoted to the sciences of physics, chemistry and biology and to modern languages."

B—"Four years of pure medical work, the first two of which should be largely spent in laboratories of anatomy, physiology, pharmacology, etc., and the last two in close contact with patients in dispensaries and hospitals in the study of medicine, surgery, obstetrics and the specialties."

C—"A final year as an interne in a hospital or dispensary should then complete the medical course."

While a college education is recognized as a desirable preparation for a limited number of men, it is not recommended to demand a baccalaureate degree as a minimum requirement to the study of medicine, as this would compel the young medical man to defer the actual beginning of his life's work to an unnecessarily late period—27 or 28 years of age.

Of the 120 medical colleges in the United States 73 (60 per cent.) require a four-year high school education or less, 17 (15 per cent.) require one year of college work and 30 (25 per cent.) colleges are now requiring two or more years of work in a college of arts.

Beginning January 1, 1914, the minimum requirement for admission will be enlarged to include at least one year's college work in physics, chemistry and a reading knowledge of at least

one modern language, besides English, preferably German or French.

Raising the entrance requirements to medical colleges in the United States has been followed by a reduction not only in the number of students studying medicine, but also in the number of medical colleges in the country. In 1904 there were 28,142 students in our medical schools, while in 1912 there were nearly 10,000 less or 18,412. Of these 65 have been closed, 37 by merger and 28 have become extinct. Between 1904 and 1912, however, 15 new medical colleges were organized.

There are on this continent 23 veterinary schools, 21 in the United States and 2 in the Dominion of Canada. All of these but one seem to be recognized by the American Veterinary Medical Association. Of the 21 schools in the United States 12 are private schools, supported entirely by student fees, and 9 are state schools dependent upon national and state aid. Of the 9 state schools in the United States all but one are intimately connected with state universities or colleges and each forming an integral part of a university or college. In Canada the Ontario Veterinary College is now affiliated with the University of Toronto.

During 1912-13 about 2,400 students matriculated in all of the veterinary schools of the United States and about 300 in the two Canadian schools, making a total of 2,700 for the continent. Of the 2,400 students in the schools in the United States 700 were in state and 1,700 in private schools. The average attendance for state schools was 77 students; for private, 141 students.

The length of the course of study in all of the private schools is uniformly three years of seven months each, or a total of twenty-one months, not exclusive of the shorter vacation and examination periods. Of the 9 state schools in the United States four maintain a three-year course of study, and three a four-year course of study. Two offer either a three or four-year course. In all state schools the length of the academic year is nine months, making a total of 27 months of required study in the three and 36 in the four-year schools.

To acquire first-hand information in regard to the present status of entrance requirement at the different state veterinary colleges on this continent, the attached questionnaire was circulated. All colleges made prompt reply and the following data are derived from the answers thus obtained:

The entrance requirements to all private schools, except one, as shown by their catalogues, do not extend beyond the eighth

grade of the grammar school, which fact is partially obscured by using the elusive label "Second Grade Civil Service Examination." In not a single instance is a high school or any part thereof a prerequisite to the study of our profession at these institutions.

On the other hand, all of the state schools but one require some high school training. Assuming that a graduate of a four-year high school is able to offer 15-16 units for entrance to a college, the entrance requirements for the different state schools at present are as follows:

	Units
Alabama Polytechnic Institute	12
Cornell (N. Y. S. V. C.)	15
Colorado State Agricultural College	15
Iowa State College	15
Kansas State Agricultural College	15
Michigan Agricultural College	15
Ohio State University	8
Ontario Veterinary College	4
University of Pennsylvania	0
*Washington State College	8-15

With one exception (Cornell), none of the state schools has its entrance requirement set by state law.

The administration of entrance requirement in eight state schools (counting Washington double) is in the hands of a special board, committee of the general faculty or some officer (at Iowa State the registrar, for instance) not connected with the Veterinary Department. In two schools (Ontario and Pennsylvania) a member of the veterinary faculty administers the entering of students. In these instances the principal and dean respectively assume the responsibility.

Credits from accredited high schools only are accepted in eight schools, leaving only two which accept the graduate of non-accredited high schools.

The effect of raising the entrance requirement to a minimum of 15 units, as given by those who have had actual experience, is as follows:

Alabama reports: "Improvement distinct and good."

Cornell: "Numbers much reduced at first, but the increase is steady."

*Dept., 15 units; school, 8.

NOTE—New York University (N.Y.S.V.C.) not listed above, has same educational standard as Cornell, being regulated by the State Department of Education.—[ED.]

Colorado: "Decreases the number 25 to 50 per cent. Increases quality fully as much. Age about the same. Matured men without basic training eliminated."

Iowa: "Some decrease in number, marked improvement in quality."

Kansas: "Younger but better quality."

Michigan: "Lessens the number, but furnishes a quality of students that can more easily carry on the study incidental to a veterinary career."

Washington: "Splendid effect."

In summary, these replies indicate only one disadvantage to be expected from raising the entrance requirement to a minimum of 15 units, *i. e.*, a decrease in the number of students. The decrease has been found, however, to be only temporary, the number gradually increasing from year to year until a large per cent at least of the loss was eliminated.

The question as to whether the entrance requirements should be raised at once or gradually to 15 units was answered as follows: Of the ten schools reporting, eight are in favor of a gradual approach to this standard, while two think it should be done at once.

In considering the hypothetical option between raising the entrance requirement to 15 units and lengthening the course of study to four years, the vote is as follows: Five of the ten schools are in favor of first requiring 15 units for entrance and later lengthening the course of study. Four take the opposite view, and one has not yet given this question sufficient consideration to form an opinion.

Summary.

1. All state schools on the continent but one require for entrance some high school training.

2. Six schools (55 per cent.) (Cornell, Colorado, Iowa, Kansas, Michigan, Washington) already require 15 units of high school work for entrance.

3. Two schools (19 per cent.) (Ohio State and Washington) require eight units.

4. One school (9 per cent.) (Alabama) requires twelve units.

5. One school (9 per cent.) (Ontario) requires four units.

6. One school (9 per cent.) (Pennsylvania) requires at present no high school training of its candidates for matriculation, but promises to do so by demanding eight units on and after 1914.

7. By comparison about the same percentage of state veterinary schools now demand as a minimum for entrance practically the same requirements in force in the majority of medical colleges—55-60 per cent. In 40 per cent. the entrance requirements to medical colleges exceed those to the veterinary schools with the highest minimum entrance standards by one to four years of college work.

RECOMMENDATIONS.

Your committee respectfully recommends:

1. That the minimum entrance requirements be made 15 units (four years) of high school work or its equivalent.
2. That the entrance requirements to all state schools be made uniform as to the character of the high school work presented for entrance in so far as this is feasible.
3. That the 15-unit standard be approached gradually.
4. That beginning September, 1915, the 15-unit standard be instituted in all state veterinary schools on this continent.

(Signed by the Committee.)

During the discussion of the above report Dr. Grange informed the association that the Toronto University, Ontario Veterinary College, would require one year high school, beginning this year.

Dr. Schoenleber, of the Kansas State Agricultural College, informed the association that the Veterinary Department would begin with 15 units in 1913.

Dr. Klein notified the association that the University of Pennsylvania would require 8 units or two years of high school work for entrance in 1914. He stated that he favored the recommendations in the report, but felt that they go too fast for the University of Pennsylvania as regards entrance requirements, as there are so many three-year high schools in the State of Pennsylvania, but that they do hope to go as fast as possible to 12-unit entrance requirements.

Dr. V. A. Moore, New York State Veterinary College, stated that entrance requirements at the institution which he represents is entirely out of his hands, being governed by the State Board of Education. He expressed his opinion that entrance requirements were of the utmost importance and suggested that we accept Dr. White's report as an ideal upon which to work.

Dr. C. A. Cary commented favorably on the report and closed

the debate with the motion to the effect that the American Veterinary Medical Association be requested to print the report as an appendix to the annual publication of the American Veterinary Medical Association. Motion was seconded and carried.

The meeting adjourned to reconvene at 4 p. m. Wednesday.

Wednesday, September 3, 4.40. Meeting called to order by President Schoenleber. In the absence of Dr. Lyman, Dr. Klein was appointed secretary pro tem.

Members present: Drs. Moore, Gill (representing New York State Veterinary College, City of New York), Fitch (New York State Veterinary College, Ithaca, New York), Milks (New York State Veterinary College, Ithaca, New York), Cary, Fish, Blair (New York State Veterinary College, New York City), Ellis (New York State Veterinary College, New York City), Murphy, Schoenleber and Klein.

At the request of Dr. Schoenleber, Dr. Cary explained to the men who had not previously attended the meetings the object of the association.

Dr. Fish moved that the temporary president and secretary as elected Tuesday be made permanent. Seconded and carried.

In order to comply with the constitution and by-laws, Dr. Fish moved that we proceed to the election of three vice-presidents; seconded by Dr. Cary. Carried.

The following were elected by acclamation: Drs. Muphy, Klein and Blair.

Dr. Moore moved that a committee of three be appointed to prepare a bulletin on veterinary education for distribution among the principals of high schools; this to be presented at the special meeting as above provided for in connection with the Live Stock Sanitary Association. Motion was seconded by Dr. Gill. Carried. For this committee the president appointed Drs. Moore, Cary and Glover.

Meeting adjourned.

R. P. LYMAN, Secretary.

PENNSYLVANIA STATE VETERINARY MEDICAL ASSOCIATION.

Meeting was called to order in the rooms of the Chamber of Commerce, Erie, Pennsylvania, September 18, 1913, at 11 a. m., by Dr. Louis A. Klein, president. The association was welcomed to Erie by Mayor Stern in an interesting address

in which he lauded the work of veterinarians and referred to interesting personal experiences with them.

Upon motion by Dr. W. H. Hoskins, Dr. W. S. Gimper was elected temporary secretary in the absence of Dr. John Reichel. Motion to dispense with roll-call carried. Motion to dispense with the reading of the minutes of the previous meeting and to adopt the minutes as issued in printed form, carried.

Dr. Klein announced the death of a former president of this association, Dr. A. W. Wier, Greenville, which occurred on June 23, 1913. The association was represented at the funeral by three members, and a floral offering was made, the receipt of which was acknowledged by letter from the widow and brother. By the death of Dr. Wier a vacancy was left in the Board of Trustees, which was later filled in accordance with the by-laws.

Reports of Delegates to Other Associations.—American Veterinary Medical Association: In the absence of a report from the delegates to this association, Dr. W. H. Hoskins reported the proceedings in a brief but very interesting talk.

He referred to the internal disorders that occurred during the early history of the association and stated that only one of the original members at the 1863 meeting was living at the present time, Dr. Liautard,—unfortunately he could not be present at the anniversary meeting. Reference was also made to the high character of the papers contributed, which were well fitted to the importance of the fiftieth anniversary meeting. There were members or visitors from every state in this country, as well as numerous representatives from foreign countries.

Dr. Hoskins referred to the election of Dr. C. J. Marshall showing appreciation of his valued services during the three years in which he was secretary of the organization.

The fiftieth anniversary meeting was conceded to be a great success in every way.

The newly elected president of the American Veterinary Medical Association was then called upon to favor us with a talk.

He stated that the association has been going forward with great strides during the past ten years. The membership has been increasing by two hundred to three hundred members each year, until at the present time there are approximately two thousand members enrolled. Every state in this country and every province in Canada is represented in the membership. Representative members of the profession in every section are members of the American Veterinary Medical Association.

The next meeting will probably be held at New Orleans during the Christmas holidays of 1914. Dr. Marshall concluded his talk with a few feeling remarks appreciative of his election and asked that all members make special efforts to attend the New Orleans meeting and give the association a good start on the second half of its century run.

Reports of Delegates to the Federation of Allied Agricultural Interests.—Dr. Klein, chairman, stated our association must join the Federation before the delegates can attend the meetings and vote. No notice of such election has as yet been received. Dr. Klein is hopeful that our State Veterinary Medical Association will be given membership in the Allied Associations, as it is greatly to the interest of the veterinary profession to be in close touch with all matters relating to agriculture. The applications of new members were then received.

As Dr. C. J. Marshall was the only member of the board of trustees present, President Klein appointed Drs. Chrisman, Irons and Greenfield to act as members of the board of trustees at this meeting.

A report from the committee on army legislation was then made by Dr. W. H. Hoskins.

Dr. Hoskins reported considerable progress. He feels confident the bill will pass the House of Representatives; but a severe battle will have to be fought in the Senate, but it will be under more favorable conditions than formerly.

There being no other committee reports and no unfinished business, the collection of dues was in order.

Following this, the board of trustees announced they had acted favorably on the applications for membership received as follows:

Dr. C. Courtney, McLean, Meadville; Dr. A. J. Mitchell, Jr., Erie; Dr. E. Greene, Cambridge Springs; Dr. R. M. Quigley, Tyrone; Dr. C. B. Palmer, Easton; Dr. James B. Hardenbergh, Philadelphia, and Dr. John Bryce, Erie.

Upon motion, the rules were suspended, the report of the committee accepted and the secretary instructed to cast a vote collectively electing all applicants to membership. Pursuant to this motion President Klein declared the seven applicants elected to membership.

Dr. C. J. Marshall, state veterinarian and secretary of the Pennsylvania State Live Stock Sanitary Board, then gave an interesting and exhaustive address in reference to recent legisla-

tion and outlined the future policies of the board in handling the subject of tuberculosis, stating that the act of March 25, 1903, known as the Butcher's Indemnity Act, was repealed. Two bills relating principally to milk and meat hygiene were defeated, but one bill which is of general interest was passed.

He referred to certain questionable practices which had led to the repeal of the Butcher's Indemnity Act and referred in particular to an organization known as the Pennsylvania State Cattlemen's Association and the desire of this association to have legislation enacted which would have raised the state indemnity to an impractical amount.

As regards milk hygiene legislation, this subject seems to be very unpopular during the last session, and the bill was defeated.

The feeding of offal and refuse on the premises of slaughter houses is against the regulations of the State Live Stock Sanitary Board. A bill to make this unlawful was offered in the legislature, but met with defeat. At this point the meeting adjourned for lunch.

The afternoon session was called to order at 2.30 p. m., and Dr. Marshall resumed his address by discussing the act which was approved July 22, 1913.

This act gives the board jurisdiction over the diseases of poultry. It requires veterinarians to report certain diseases affecting various animals. It strengthens the board's power in establishing quarantines and modifies the requirements governing the interstate movement of cattle. By this modification foreign cattle intended for shipment into Pennsylvania should be inspected and tested before being brought into the state. Otherwise they may be brought in only under supervision of a member, officer or agent of the board after due notice of such shipment has been given. When cattle have been brought in under this clause, they are inspected and tested by duly appointed agents of the board at the expense of the state.

The permit system which was formerly in vogue, allowing cattle to be brought in under quarantine to be tested at destination, has been discontinued.

At this point the speaker digressed from the subject of new legislation and referred to the policies adopted by the board in handling tuberculin tests on native cattle.

During the past few years it has been customary, as far as funds would permit, to make such tests at the expense of the commonwealth. The herd owners were required to sign an application in the form of a contract, agreeing to certain things. It

practically usurped the control of their herds and placed them under the jurisdiction of the board until the terms of the contract had been complied with. This procedure has in many instances resulted in situations very embarrassing to both the owner and the board. The herd owners would not read the contract carefully and were not aware of the obligations which they were assuming.

In view of this dissatisfaction and the embarrassment resulting from the present attitude of the state auditor general, in refusing to pay indemnity vouchers, it has been decided for the present at least, to discontinue the testing of native herds at state expense.

When an owner desires to rid his herd of tuberculosis by having it tested by a competent veterinarian at his own expense, all possible assistance will be rendered him as formerly.

Dr. Marshall then referred to other requirements of the new law which governs the sales and use of biological products; permits the branding of reacting cattle, and compels the pasteurization of skim milk and separator slop before being returned to the farmers to be fed to calves and swine. This last feature is of special importance from the economical standpoint as well as in relation to animal's health. Each year thousands of carcases of cattle and swine are condemned by reason of being extensively affected by tuberculosis. Exhaustive investigations have proven that a very large percentage of these conditions is due to feeding of skim milk from tuberculous cattle. The point has been reached where it becomes necessary to conserve our meat supply. The condemnation of these tuberculous carcases has a visible effect in reducing the general supply, and it becomes necessary to remove one of the prolific sources of reduction by compelling the proper pasteurization of skim milk and separator slop before being fed to young animals.

Other prolific sources for the dissemination of tuberculosis are the practice of feeding swine behind tuberculous cows and feeding uncooked slaughter-house offal to hogs.

Following Dr. Marshall's address, a lively discussion ensued, the members showing a keen interest in upholding and extending the work of the board.

A paper entitled " Phenol in the Treatment of Tetanus," contributed by Dr. Victor G. Kimball, of Philadelphia, was read by Dr. M. J. Chrisman.

This was followed by a statistical statement of the results obtained in Pennsylvania in the testing of native and interstate

cattle during the year 1912 as compared with the average results obtained during the preceding fourteen years by Dr. W. S. Gimper.

Dr. H. T. Goetz, of Buffalo, was called upon by the president to relate interesting experiences in the use of cannabis.

He stated much better results had been obtained by highly diluting cannabis extract with diluted alcohol.

It was necessary to omit several papers, owing to the absence of the contributors, and Dr. Gimper was called upon to give a brief outline of the legal proceedings instituted by the board to recover money paid by the state to the owners of a herd which had been tested at state expense under the form of contract previously referred to by Dr. Marshall.

In this case civil suit for recovery had been instituted, judgment was given in favor of the commonwealth for the full amount of indemnity paid with interest and costs. The decision of the court in this case influenced somewhat the proposed change in the method of handling tuberculin tests on native cattle at state expense.

Under the head of new business, Dr. J. B. Irons, of Erie, was elected to fill the unexpired term of Dr. A. W. Wier.

On motion by Dr. D. B. Fitzpatrick, an unanimous and hearty vote of thanks was tendered the local committee of arrangements.

On motion of Dr. Bryce, a vote of thanks was tendered the Erie Chamber of Commerce for the use of the meeting room.

On motion the meeting was declared adjourned at 5 p. m.

It was the consensus of opinion that this meeting was one of the pleasantest and most successful semi-annual meetings held in recent years, thirty-seven members and visitors being present.

W. S. GIMPER, Secretary *pro tem.*

ALUMNI ASSOCIATION OF THE NEW YORK-AMERICAN VETERINARY COLLEGE.

A special meeting of the Alumni Association of the New York-American Veterinary College was held September 3, 1913, at the Hotel Astor, New York City. The president, Dr. Chas. S. Chase, of Bay Shore, occupying the chair. In the absence of the secretary, Dr. Percival K. Nichols, Dr. J. Payne Lowe, of Passaic, N. J., was elected secretary pro tem.

Owing to the fact that the Fiftieth Anniversary Meeting of

the American Veterinary Medical Association was in progress, a large number of the alumni were present; the following were in attendance: W. H. Gribble, Washington Court House, Ohio (A. V. C., 1884); Lester H. Howard, Boston, Mass. (A. V. C., 1882); Warren L. Rhodes, Lansdowne, Pa. (A. V. C., 1893); David W. Cochran, New York City (Columbia V. C., 1879); Geo. H. Berns, Brookyn, N. Y. (Columbia V. C., 1879); Maffitt Smith, New York City (N. Y.-A. V. C., 1903); W. J. McKinney, Brooklyn, N. Y. (N. Y. C. V. S., 1898); Chas. S. Chase, Bay Shore, N. Y. (N. Y.-A. V. C., 1906); U. S. G. Bieber (A. V. C., 1891); J. W. Scheibler, Memphis, Tenn. (A. V. C., 1885); John D. Fair, Millersburg, O. (A. V. C., 1887); Wallace F. Vail, Greenwich, Conn. (N. Y.-A. V. C., 1905); Robert W. Ellis, New York City (A. V. C., 1889); John C. Meyer, Cincinnati, Ohio (A. V. C., 1876); David McAuslin, Brooklyn, N. Y. (N. Y.-A. V. C., 1907); W. Horace Hoskins, Philadelphia, Pa. (A. V. C., 1881); E. B. Ackerman, Brooklyn, N. Y. (A. V. C., 1891); J. Payne Lowe, Passaic, N. J. (A. V. C., 1891); R. H. Kingston, New York City (N. Y.-A. V. C., 1904); Henry Cady, Gloversville, N. Y. (A. V. C., 1887); James T. Glennon, Newark, N. J. (N. Y. C. V. S., 1896); Geo. W. Smith, Hoboken, N. J. (N. Y.-A. V. C., 1903); R. F. Meiners, Boonton, N. J. (N. Y.-A. V. C., 1899); Thos. E. Smith, Jersey City, N. J. (N. Y. C. V. S., 1897); Louis J Beloff, New Brunswick, N. J. (N. Y.-A. V. C., 1902); John B. Hopper, Ridgewood, N. J. (A. V. C., 1892); Wilfred F. Harrison, Bloomfield, N. J. (A. V. C., 1887); Thomas C. Maloney, Fall River, Mass. (N. Y. C. V. S., 1889); Jos. A. De Groodt, Morristown, N. J. (N. Y.-A. V. C., 1913); Wilbur B. Maxson, New York City (N. Y.-A. V. C., 1911); C. R. Borden, 7 Adams St., Taunton, Mass. (A. V. C., 1892); Chas. W. Shaw, New York City (A. V. C., 1892); Frederick P. Ruhl, Milford, Del. (A. V. C., 1885); Frank P. Dorian, Yonkers, N. Y. (A. V. C., 1893); H. B. Cox, Philadelphia, Pa. (A. V. C., 1895); W. G. Hollingworth, Utica, N. Y. (A. V. C., 1884); M. W. Drake, Philadelphia, Pa. (A. V. C., 1890); Edw. F. Koehler, Easton, Pa. (A. V. C., 1890); Arthur L. Grover, New York City (A. V. C., 1897); Geo. W. Meyer, New York City (A. V. C., 1891); Samuel Atchison, Brooklyn, N. Y. (N. Y. C. V. S., 1887).

The president stated that the object of calling the special meeting was to get together a large number of the alumni and stimulate them into activity. He told of the passage of an act known as Chapter 676 of the Laws of 1913, whereby the New

York-American Veterinary College was adopted by the State of New York, under the title of the New York State Veterinary College, established at New York University in the City of New York.

He spoke of the responsibility and duty of each allumnus to his alma-mater, and asked for united support, and regular attendance at the meetings, so that the association will become a power, and meet the problems which confront it in its new era.

Dr. W. Horace Hoskins and others spoke, and gave their views as to how the association could be awakened into active usefulness.

The advisability of the association publishing an alumni history was freely discussed, different members present volunteered to write the history of their respective classes.

The following motion was voted upon and carried. "That the present officers of the alumni association, in connection with ten members, constitute themselves a committee to get up a history of the alumni of the A. V. C., the N. Y. C. V. S. and the N. Y.-A. V. C., the president to appoint the said ten members at his convenience. Moved and seconded that we authorize the officers to suspend the by-laws, so that the president may call a special meeting annually during the progress of the A. V. M. A. meeting—carried.

Moved and seconded that the President appoint a Committee to revise the present constitution and by-laws—carried. The president appointed the following: Dr. H. D. Gill, chairman; Drs. Ellis, Cochran, Smith (Thos.), Berns and Ackerman.

The following contributions were received (see above list). Total, $41. Moved and seconded to adjourn—carried.

J. PAYNE LOWE, Secy. *Pro. Tem.*

VETERINARY MEDICAL ASSOCIATION OF NEW YORK CITY.

(October Meeting).

The regular monthly meeting of this association was called to order by President McKinney at 8.45 p. m.

The minutes of the June meeting were read and approved.

The prosecuting committee reported progress.

The president then called for the reports of the delegates to

the A. V. M. A. and the New York State Veterinary Medical Society.

Drs. Ellis and Blair gave a concise report of both meetings.

Dr. Louis Griessman, of New York City, then read a paper entitled, "Unfair Competition and Its Evils."

This paper was productive of quite a discussion, and several members and visitors expressed their views of the best means of dealing with illegal practitioners and veterinarians who underbid their fellow practitioners.

Dr. T. E. Smith, of Jersey City, stated that in Jersey City they had from time to time prosecuted illegal practitioners, but that the real object of our veterinary associations should be the advancement of the profession and the banding together of its members. Also said that in his opinion it would be better to educate the public on different lines by the example of better work done by qualified men, thus causing the public to repudiate the quack. Said that we should not be too grasping for a dollar, and illustrated his point of view by a story told in his own inimitable way.

Dr. DeVine said that he agreed with Dr. Smith, and thought it best that a prosecuting committee pick their cases, and thus avoid adverse criticism. Action should be taken first against intemperate, disgraceful or vicious persons who are violators of the law.

There was also a general discussion on Dr. Griessman's reference to undercharging by certain practitioners, and it was urged that such cases be investigated and some action taken.

Dr. DeVine then stated that the Commissioner of Agriculture had asked him to confer with the New York City veterinarians regarding the glanders situation, and stated that at a conference of State and City veterinarians the following recommendationss were adopted:

First—The licensing of all stables.

Second—A disinfecting corps to be attached to the regular veterinary staff.

Third—That the ordinance relating to the tagging of all animals sent to the offal dock be rigidly enforced, thus making it easy to trace a diseased animal.

Fourth—That a competent pathologist be stationed at the offal dock.

Fifth—That all reactors to the recognized tests be properly identified in some way.

Sixth—That the use of mallein and vaccine should be re-

stricted to the official veterinarians, or, if used by others, under their supervision and co-operation.

Seventh—That the owner in all cases be represented by his own veterinarian.

Dr. McKinney stated that in his judgment the recommendations were excelent.

Dr. R. W. Ellis also spoke in favor of the same, and moved that they be endorsed by this association; seconded and unanimously carried.

A general discussion of the sera tests for glanders then took place, in which a number of those present took part. The eye test was also discussed, and Dr. Kingston stated that he had excellent results with the same. Advocates the use of the brush in applying the concentrated mallein to the eye.

Several papers were promised for the next meeting.

No further business appearing, the meeting adjourned.

R. S. MacKellar, Secretary.

MASSACHUSETTS VETERINARY ASSOCIATION.

The regular meeting of the above association was held at Young's Hotel, Boston, Wednesday evening, September 24, 1913. Members present were: Drs. Burr, Dodge, Draper, Emerson, Peirce, Seale, Simpson, Stanbridge, Robinson, Winchester and Pugh; and as guest, Dr. F. H. Slack, of the Boston Board of Health, who read a most excellent paper,* the subject of which was, "The Significance of Pus and Streptococci in Milk."

In the absence of President Perry, First Vice-President Seale took the chair and called the meeting to order at 5.40 p. m. A motion was made by Dr. Emerson, seconded by Dr. Peirce, that reading of the records of the previous meeting be deferred until Dr. Slack had read his paper. Carried. Dr. Burr then introduced Dr. Slack. At the conclusion of his paper, Dr. Slack was tendered a hearty vote of thanks; and from the keen discussion which followed, his subject proved to be intensely interesting. The secretary then read the minutes of the previous meeting and outing, which were accepted.

Dr. Robinson then moved, seconded by Dr. Simpson, that the meeting adjourn.

W. T. Pugh, Secretary.

* Will be published in our next issue.

KEYSTONE VETERINARY MEDICAL ASSOCIATION.

The regular monthly meeting of K. V. M. A. was held on Tuesday evening, November 11, 1913, in Donaldson's Hall. The meeting was called to order by President Yunker, and about twenty-five members were present.

The first essayist for the evening was Dr. Geo. W. Pope, of the B. A. I., who read a very interesting paper on "Our Increased Knowledge Concerning the Nature of Animal Diseases." He showed what was known thirty years ago about Veterinary Medicine, also the mysteries which baffled the men of that time. Then he took up the principle diseases and showed the remarkable progress that we have made in the studying of these diseases.

The next subject to be considered was "The Importation and Breeding of Draft Horses in Pennsylvania," by Dr. Carl W. Gay.

He showed clearly how Pennsylvania could be made one of the chief draft breeding States in the Union; that it possessed the land, climatic conditions and feeding facilities.

There were two men admitted to membership: Dr. Victor G. Kimball and Dr. Francis Murphy. Adjournment.

CHESTON M. HOSKINS, Secretary.

UTAH VETERINARY MEDICAL ASSOCIATION.

The fourth annual meeting of the above association was held in the Commercial Club Building in Salt Lake City, October 4, 1913, at which the following resolution was passed:

Be it resolved that the Utah Veterinary Medical Association hereby appeal to the state authorities that only qualified graduate veterinarians be allowed to apply the mallein and tuberculin tests for all state and expert purposes.

And be it further resolved that a copy of this resolution be sent to the Governor of the state, the State Live Stock Inspector and the State Board of Sheep Commissioners.

The following members were elected as officers for the ensuing year: President, Dr. Elmer, of American Forks; vice-president, Dr. A. J. Webb, of Ogden; secretary and treasurer, Dr. E. P. Coburn, of Brigham City.

The outgoing officers were: Dr. Walter Emms, of Salt Lake City, president; Dr. Arch Egbert, of Logan, vice-president, and Dr. R. H. Haggan, of Richfield, secretary and treasurer.

Salt Lake City was the place selected for the semi-annual meeting next spring, and an interesting program is promised.

E. P. COBURN, D.V.M., Secretary and Treasurer.

CONNECTICUT VETERINARY MEDICAL ASSOCIATION.

The semi-annual meeting of the above association was held in Waterbury, August 6, 1913. The day was devoted to clinics at Dr. Thos. Bland's hospital. There were many interesting and instructive cases presented for examination and diagnosis. Among the operations performed were four cases of roaring and two cases of oopherectomy in mares, which presented excellent prospects of good results from the operations.

In the evening a banquet was held at Hotel Elton. Following the banquet the business meeting was held. After the business had been transacted the following papers were presented: * Impaction of the Cecum in the horse, by Dr. A. T. Gilyard; * Hog Cholera Serum in Practice, by Dr. Chas. L. Colton. The papers were very interesting and the discussion of them brought out many instructive features.

The following members were in attendance: Drs. Thos. Bland, H. E. Bates, H. C. Balzer, C. H. Beere, G. T. Crowley, C. L. Colton, F. D. Coles, G. L. Cheney, G. E. Corwin, Jr., B. K. Dow, P. F. Finnigan, J. J. Flaherty, A. T. Gilyard, L. B. Judson, V. M. Knapp, A. C. Knapp, P. T. Keeley, G. W. Loveland, J. J. Moynahan, E. H. Morris, F. D. Monell, B. D. Radcliff, E. C. Ross, J. S. Schofield, E. F. Schofield, A. W. Sutherland, Oscar Schreck, R. S. Todd, J. E. Underhill, H. Whitney, I. R. Vail and honorary member, H. O. Averill. Vistors, Drs. T. S. Childs, B. D. Pierce, A. McHugh, R. P. Lyman, J. F. Laden, also several friends of the members.

B. K. Dow,
Secretary.

* Will be published in the next issue.

SCHUYLKILL VALLEY VETERINARY MEDICAL ASSOCIATION.—Secretary Huyet, of Wernersville, Pa., announces next meeting of this association at Reading, Pa., December 17, 1913.

KANSAS VETERINARY MEDICAL ASSOCIATION.—Secretary Burt, of Manhattan, announces the tenth annual meeting of this association at that place January 6, 7 and 8, 1914, and wants every veterinarian in Kansas to be present.

NEWS AND ITEMS.

RULING AS TO COCAINE PRESCRIPTIONS.

To the Editor of the ERA:

I am enclosing herewith an opinion rendered by the Attorney-General relative to rights of dentists and veterinarians in regard to writing prescriptions containing cocaine or eucaine under the present law enacted by the present Legislature. This opinion was asked for in response to an inquiry from a licensed veterinarian in which he stated a prescription that he had written was refused to be filled by a licensed pharmacist.

Very truly yours,

WARREN L. BRADT,
Secretary State Board of Pharmacy.

Albany, July 8, 1913.

PENAL LAW, SECTION 1746.—SALE OF COCAINE.—PURCHASE VETERINARIAN.

Veterinarians may not purchase cocaine of a druggist except in the original package, nor may prescriptions signed by them be filled.

INQUIRY.

A veterinarian presents to a druggist a prescription calling for cocaine "to be used by veterinarian." May the druggist under the amendment made this year to Section 1746 of the Penal Law fill this prescription?

OPINION.

An elaborate scheme for the control of the sale and possession of cocaine and its products is provided by the statute. Sales may be made only to certain classes of persons, in the original packages, and in limited amounts. The classes to whom such sales may be made are pharmacists, druggists, including both manufacturers and dealers, physicians, veterinarians and dentists. Every sale must be recorded, with full details as to amount,

date, and name of purchaser, and all cocaine purchased must be kept, with two exceptions, in a place specified in the record of sale. The two exceptions as to keeping the drug in a specified place are of sales under physicians' prescriptions and of certain limited quantities which may be carried by a physician, veterinarian or dentist for use in his profession.

No provision is made for the filling of prescriptions by dentists or veterinarians, and such use of the drug as these two classes may make in their profession is therefore limited to that of direct personal administration. An attempt by a dentist or veterinarian to use the drug by means of a prescription to be filled by a druggist is penalized by making it a misdemeanor for anyone not of the class specifically authorized, to have any of it in his possession, without the certificate of the person making the sale, stating the name and address of the physician upon whose prescription the sale is made.

I am therefore of the opinion that a druggist is not authorized to fill a prescription calling for cocaine, signed by a dentist or veterinarian, and that the right of dentists and veterinarians to use the drug is limited to its purchase in original packages and direct administration to the patient.

Dated July 2, 1913.

(Signed) THOMAS CARMODY,
Attorney-General.

—*The Pharmaceutical Era,* August, 1913.

URUGUAY VETERINARY COLLEGE.

[Consul Frederic W. Goding, Montevideo.]

It is now seven years since Dr. D. E. Salmon, the American veterinary expert, was engaged by the Government of Uruguay to organize a faculty and frame plans for a college of veterinary medicine and surgery. Dr. Salmon completed his work in a most satisfactory and able manner, remaining one year longer than his contract called for, the result being one of the largest, best equipped, and most modern institutions of its class in existence.

The most important industry here—live-stock breeding—demanded a change from the former rudimentary and empirical methods of treating diseased animals, as well as better sanitary methods of inspection for the meats produced in the country, which had found good markets in foreign countries, and required

the most thorough scientific inspection in order to inspire confidence in them as wholesome food materials. Hence, one of the prime objects of the college was the training of young men for that work.

Instruction has heretofore been given in rented buildings, but recently the college and all its appurtenances was moved to the splendid structures planned and supervised by Dr. Salmon, which will remain a monument to commemorate the splendid services rendered by him to scientific education in this Republic. They are located on an estate of 30 acres, in Larranaga Street, in the outskirts of Montevideo. The buildings include the main building, in which are lecture rooms, classrooms, laboratories for pathological and parasitological anatomy, bacteriology, and experimental medicine, with photographic cabinet, and other annexes; the hospital, with the upper floor devoted to the library, the ground floor to the pharmacy, the medical and operating clinics, the outdoor consulting room, cabinets for hydrotherapeutics and electrotherapeutics, box stalls for sick horses and cattle, cages for dogs, other small animals, and fowls. Other than these are the buildings for anatomy dissections, and slaughter, under construction and nearly completed, and those for forage, ambulances, and blacksmith shop are to be built. The plans also include a hospital for animals and one for contagious diseases.

For a very moderate fee in the public hospital are received all classes of sick animals, the consultations and medicines being free.

A provisional program of studies has been heretofore followed, but, beginning with the year 1914, a bachelor's degree will be required for matriculation, except only the graduates from the Military College, who will be admitted on the diploma of that institution. The new course of study is as follws:

First Year—Anatomy of domesticated animals; dissections; normal histology and microscopy; embryology and teratology; medical physics and chemistry.

Second Year—Physiology; external anatomy of domesticated animals; general zootechnics; parasitology; general pathology; propedentic clinics; materia medica and pharmacology.

Third Year—Medical pathology and clinics; surgical pathology and clinics; topographic anatomy; operative medicine and horseshoeing; general anatomy and pathological histology; special zootechnics and autopsy technique; microbiology.

Fourth Year—Contagious diseases and sanitary police; inspection of meats and milk; medical and surgical pathology; obstetrics; hygiene; special pathological anatomy and legal medicine; toxicology and jurisprudence.—(From *Daily Consular and Trade Reports*, Washington, D. C.; by courtesy of Dr. A. M. Farrington, B. A. I., U. S. Department of Agriculture.